2017
Serfoji Rajah 1830

DISCOURSES

ON THE

NATURE AND CURE

OF

WOUNDS.

THE TANJORE MAHARAJA SERFOGI'S SARASWATI MAHAL.
2102
2454

IN TWO VOLUMES.

BY JOHN BELL, SURGEON.

THE SECOND EDITION.

VOL. II.

OF PARTICULAR WOUNDS.

OF WOUNDS OF THE BREAST.
OF WOUNDS OF THE BELLY.
OF WOUNDS OF THE HEAD.
OF WOUNDS OF THE THROAT.
OF DANGEROUS WOUNDS OF THE LIMBS.
OF THE QUESTION OF AMPUTATION

EDINBURGH:
PRINTED BY MUNDELL & SON, ROYAL BANK CLOSE;
FOR T. CADELL, JUNR. AND W. DAVIES, IN THE STRAND, LONDON.

1800.

~~2012~~
2402

TO

EDMOND GOODWYNE, M. D.

THIS SECOND VOLUME OF DISCOURES ON WOUNDS,

IS PRESENTED BY THE AUTHOR,

AS A TESTIMONY OF RESPECT

AND AS A SLIGHT ACKNOWLEDGMENT

FOR THE

INSTRUCTION AND PLEASURE DERIVED FROM HIS

TREATISE ON RESPIRATION.

DISCOURSE I.

OF

WOUNDS OF THE BREAST.

HAVING paſſed through all the intricacies which belong to the general treatment of gun-ſhot wounds, we now advance to the more plain and eaſy doctrine of individual wounds: And in diſcourſing upon wounds of the thorax, it is natural, firſt of all, to reflect upon the very important parts which are contained there,—the heart, the lungs, the great veſſels, the thoracic duct: We cannot but wonder, that wounds of ſuch a cavity are not always mortal; but ſtill more muſt we be ſurpriſed at men eſcaping eaſily from the moſt deſperate wound of the lungs; ſurviving for many hours, or even days, where the weapon had abſolutely touched the heart itſelf. But wonder is ignorance, and as our knowledge advances wonder ſubſides; for in a ſubject like this, we compare the ſtructure of the parts with the conſequences of the wound, ſo as to arrive by ſlow ſteps at a knowledge of the true proportion betwixt the wound and

the dangers ; and all that was wonderful at firſt, vaniſhes in the end.

We know that the cheſt contains the heart, the lungs, the great arteries and veins. We know that if the heart or great veſſels be wounded, there come on coldneſs, fainting, oppreſſion, a total ſinking of the pulſe, paleneſs, and death ; that if the lungs be wounded, there is an emphyſema, or a breathing of air into the cellular ſubſtance, ſpitting of blood, difficult breathing, ſuffocation, and death ; and if the patient outlive the danger, we expect pains in the cheſt, diſtreſs in breathing, dreadful cough, ſpittings of blood, reſtleſs nights and fearful dreams ; and there will be, from time to time, hopes of recovery, followed by frequent relapſes, threatening death ; and we are beſides, during all this ſuffering and pain, obliged to uſe bleedings, ſo profuſe as to be almoſt as dangerous as the wound itſelf.

If ſtill our patient eſcape theſe early dangers, there are others, ſlower in their progreſs, but perhaps not leſs to be feared. There come next, tedious ſuppurations of the cheſt, with diſcharges of broken ribs ; then the wound ſwells, and the matter is confined ; then a deluge of matter burſts out at laſt after long ſuppreſſion,—it burſts out with a temporary relief ; but the diſcharge continues ſo profuſe, that weakneſs, fever, confirmed hectic, enſue, which hectic, unlike the true conſumption of the lungs, is ſometimes cured.

Sometimes alſo, it happens, that the outward wound heals when all is not ſound within : then matter form-

ing oppreſſes the lungs, and the patient labours ſo much in his breathing, that if the making an opening for that matter, either be not propoſed, or be not allowed, it collects in ſuch quantity, that the whole breaſt is diſordered and oppreſſed, and the patient dies.

Thus we have before us in one view all the dangers of wounded lungs; oppreſſion and ſuffocation at firſt; after that, high inflammation and pain; then long continued ſuppurations and waſtings of the lungs, ſo that a ſmall bud or tubercle only is left of them; and in the end, great oppreſſions from effuſions of matter or of blood. We feel that wounds of the lungs are moſt intereſting, from their dangers; from our ſeeing the cauſe of danger ſo plain and open; from our giving ſuch immediate relief, ſometimes by a bold uſe of the bleeding lancet, ſometimes directly by the immediate touch of the knife, to make way for the matter or blood.

I have already hinted at a thing really wonderful, that the thorax, containing the heart, lungs, and great veſſels, ſhould be ſo often wounded with ſo little danger. Many no doubt die, but numbers eſcape; for a wound of the ſubſtance of the lungs is far from being mortal. The blood may ſuffocate the patient; the fever and pain may waſte him; he may die of the inflammation or of the oppreſſion of the lungs; or there may be time for a large ſuppuration, or a lingering hectic to cut him off; but ſtill, if his wound be only in the edges of the lungs, he is in ſome degree

ſafe; he is only in danger when the thick ſubſtance of the lungs is perforated, and falls into abſceſs, or when the root of the lungs is wounded, for there the large veſſels of the lungs being opened, the great effuſion of blood, like that from a wound of the heart itſelf, muſt kill, even by the quantity of blood loſt to the general ſyſtem; but beſides, this blood being thrown into the trachea, deluges the lungs, the patient ſpits up a frothy blood, blood inſtead of air occupies the lungs, ſo that he ſtruggles for breath but a few moments, and then expires.

But ſtill I return to the firſt part of this propoſition, to that which ought to be the moſt particularly impreſſed upon you, that though no doubt many die, numbers do eſcape; they often recover from wounds of the bayonet or ſmall ſword; many recover alſo who have been ſhot fairly through the thorax, with fractures of the rib both before and behind, with many dangerous ſplinters of bone driven in upon the lungs; ſome of thoſe wounded with the ſmall ſword have hardly been ill, or have recovered in a few days; and even thoſe wounded with balls acroſs the cheſt have recovered in a month.

When the lungs are wounded, the diſtreſs and danger of your patient muſt ariſe either from emphyſema,—or from extravaſation of blood,—or from the ball,—or cloth or ſplinters of the ribs, either lying in the cavities of the thorax, or abſolutely ſticking in the lungs: But beſides theſe preſent dangers, there is a ſecond train of dangerous ſymptoms which you muſt

alſo learn to manage, eſpecially long continued ſuppuration in the breaſt,—callous ſores,—exfoliating bones,—or (the wound having actually cloſed) there may be collections of pus within the cheſt, and the operation of empyema may need to be performed. If I ſhould diſcuſs each of theſe points, I think that you would be bold and ſkilful in managing ſuch a caſe.

I. Of Blood poured out into the Cells of the Lungs.

When a man is ſhot through the lungs, if death be very near, it muſt be from ſuffocation; and you will find him with a bloody foam at his mouth; his face pale in the cheeks, and livid round the lips and eyes; heaving the breaſt with intolerable anguiſh; toſſing from ſide to ſide in bed; the bloody foam increaſing; the breathing becoming more difficult, and the blood and air rattling in the throat; then the pulſe flutters, and the extremities continually grow colder, till (ſtruggling, in ſomething like a convulſion) he expires.

If you find your patient ſpitting blood and breathing high, but not much oppreſſed, or his oppreſſion increaſing very ſlowly, you may hope to ſave him. If there be no great veſſel wounded in the lungs, ſo as to ſuffocate him at once, it is probable that the ſmaller veſſels which are opened by the wound, will gradually ceaſe to bleed; and after four or five days

of alarming cough, with bloody expectoration, that ſymptom will ceaſe; and in order that he may the ſooner be relieved from his danger, you muſt bleed very freely: let it be your intention to reduce him very low by quick bleedings; and let theſe bleedings have the effect of continued internal hemorrhagy, without the dangers of it; let them depreſs him to the ſame low condition to which the inward bleeding would moſt likely have brought him; and the ſyſtem being emptied in this direction, there will be leſs danger of immediate ſuffocation in the lungs, and but little fear of the ſucceeding inflammation riſing too high. It is only by theſe repeated bleedings that the patient can be ſaved: you muſt keep the vaſcular ſyſtem low in action, and ſo drain it as to prevent the lungs from being oppreſſed with blood.

One thing is very clear, that if you bleed only when the cough and bleeding from the lungs return, you never can do wrong; for this is the plain matter: The patient lying ſtruggling before you, is to loſe a given quantity of blood; if it be allowed to flow out into the lungs, he may be ſuffocated; if you draw it from the arm, this ſuffocation is prevented; if you keep him low enough by bleeding, there will be no blood to ſpare for this extravaſation into the lungs; if you bleed only when the bloody extravaſation returns, you are taking no blood away but that which you cannot ſave; and thus you ſee, that it is only the moſt profuſe bleeding that can keep your patient from ſuffocation; and *that* will be eſtabliſhed in your mind

as a rule of found practice, which feemed fhocking and dangerous, when mentioned in explaining only the general nature of wounds; you will feel, by fuch cafes, that the French furgeons (with all their partiality for bleeding), could hardly, in fuch a cafe, go too far.

II. Of Blood poured out, not into the Cells of the Lungs, but into the Cavity of the Chest.

The next caufe of fuffocation, is blood thrown out into the cavity of the thorax, not into the cells of the lungs:—it is lefs dangerous and more eafily relieved; and it may proceed from one of two kinds of wound, either from a fractured rib having torn the intercoftal artery; or from blood coming, not thus from the walls of the thorax, but from the lungs, which often bleed out into the thorax, as well as upwards into the throat.

If the blood which oppreffes the lungs come from the lungs, then it is attended with a foaming of blood at the mouth, and a continual cough; if it come from the intercoftal artery only, then there is no coughing of blood, but an oppreffion increafing every hour. In either cafe the patient is in a melancholy condition; and indeed this oppreffion from blood merely, gives him all the appearance of one who is wounded in fome of the great veffels, and foon to die. The patient, in a few minutes after he is wounded, begins

to be oppreſſed ; he cannot lie down ; he ſits in bed raiſed up with pillows ; he often ſtarts up in great agony, crying out that he is ſuffocating : he draws his breath with great contortions and writhings of the body, with anxiety and fear of inſtant ſuffocation, ſuch as cannot be deſcribed ; he draws his breath with contortions and great effort, and yet receives not half his quantity of air ; his voice begins to be obſtructed, his face becomes livid, his eyes turgid, his extremities cold, his pulſe oppreſſed, quick, and fluttering ; there is a rattling in his throat, and his forehead is bedewed with a clammy ſweat.

If the patient be not in the hands of a ſkilful ſurgeon, he will ſurely die. But when the ſurgeon thruſts in his finger to ſearch the wound, he feels hot blood ; it follows his finger ; even the getting out a little blood in this way is a relief, and the patient is fully relieved by a more regular emptying of the thorax : often, the ſurgeon ſeeing that blood follows the finger, and being ſenſible of the true cauſe of this oppreſſion, brings his patient over the ſide of the bed, as in tapping for the dropſy, makes him ſupport himſelf upon his hands, and hang with his head reclined ; by this dependent poſture the blood iſſues from the breaſt, and he is for the time relieved, breathes more calmly, returns to bed, lies quietly down, and continues in tolerable eaſe for twelve hours, till, perhaps, the blood flowing from the wounded artery, fills the cavity of the thorax ſlowly, and the breathing becomes again difficult in proportion as the breaſt fills : he is

again put into this diftreffing pofture, and again the thorax is emptied of its blood; and thus, from dreffing to dreffing, he is relieved and kept fafe from fuffocation, till at laft this inward bleeding ceafes, and allows the wound to clofe.

It is not merely the laying the patient in this pofture, that will always relieve the breaft; the blood flows with extreme difficulty; fometimes coughing, or the patient's endeavours and ftrainings help to empty the cheft, the putting the finger into the wound always affifts; the flowing of the blood is made extremely eafy when a large canula is introduced into the wound; any tube that is moft at hand will ferve; on many occafions, the furgeon has found even fo fmall a tube as the catheter of ufe. But why fhould fo harmlefs an operation as this be fpared? Let a large canula be introduced into the wound, at every dreffing, every twelve hours, oftener if the breathing be oftener oppreffed, and repeated daily, till the blood, becoming gradually paler, ceafes to flow. If a ball have paffed through both fides, the danger and oppreffion will be very great; and both fides of the thorax muft be freed of blood. If the oppreffion comes on inftantly, there is danger left fome great artery be wounded; if it come more flowly, but at laft arrive at that degree which the patient can no longer bear, it is clear, from the flownefs, that it is fome fmaller veffel: If there be oppreffion of the breaft, without bloody expectoration, the bleeding is from the intercoftal artery only, and there is no wound in the lungs.

Whatever may be the cauſe of this inward bleeding, theſe are your RULES: Firſt put in your finger; perhaps it may diſcover, or may evacuate the blood:—If the blood do not follow the finger, then ſome tube muſt be introduced, and the tube for ſo ſimple a buſineſs need not be a nice one: If you cannot get your tube into the thorax, and the breathing continue oppreſſed, you muſt enlarge the wound, and enlarge it freely; to be afraid of expoſing the lungs to air when they are already torn with a bullet, and loaded with blood, is mere childiſhneſs, and uſeleſs theory, very unlike the proper management of ſuch wounds. If you find the wound in the thorax too high, above the third or fourth rib; and if you find that no poſtures of the patient, however willing or able to turn himſelf, will bring the blood eaſily in that way; or, if you find the wound confuſed, oblique and difficult for you to dilate, you muſt do an operation which, as it is commonly practiſed for pus in the breaſt, is called the operation of EMPYEMA: that is, you muſt make a very free inciſion in the line betwixt two of the ribs, then puncture the pleura with a lancet, and introduce your tube there; or, in plain language, whenever you find that the natural wound will not empty the thorax, you muſt not fear to make a new wound, and you will make it in what is called the choſen point, the point of election, *i. e.* low betwixt the ſeventh and eighth rib, that there may be an eaſy drain. But whenever the wound is about the middle of the thorax, dilate it rather, which both changes the nature of the

wound and gets out the blood. When this blood proceeds from a wound of the intercostal artery, such free incisions are the more necessary; they allow us to see the artery, to feel the jet of its warm blood, by putting in the finger, and this allows us to press it with a compress, or to tie it with the needle and thread.

III. Of Emphysema or the Tumor formed by Air blown out from the Lungs into the common cellular Substance, or confined within the Thorax and oppressing the Lungs.

The emphysema is very frequent after fractures of the ribs, and sometimes follows common wounds. It arises from the air escaping, first, from the lungs into the thorax; then, from the thorax, through the wound of the pleura made by the fractured rib; then, from the cellular substance, which is over the rib, passing along till it inflates the cellular substance over the whole body. It is more frequent after a fractured rib, because there is there a wide laceration of the lungs, and no exit for the air; it is less frequent in large wounds with a knife or broad sword, because there the air has an open and unimpeded issue; it is again more frequent in deep stabs with the bayonet or small sword; and it is peculiarly frequent in gun-shot wounds, because the orifice in the skin inflames and swells, while the wound is wider within: We often find an equal degree of emphysema at both wounds,

viz. that where the ball entered, and that by which the ball paſſed out, and we need to make ſcarifications at each wound, which we do the more willingly, becauſe ſuch ſcarifications empty the windy tumor of its air, and if neceſſary, they can be made ſuch as to empty the thorax of blood, or to give room for ſearching with the finger, and extracting the ſplintered bones.

This emphyſematous or windy tumor is one of the ſtrangeſt accidents that happens in wounds of the cheſt: It advances ſo quickly, ſwells the whole body, cloſes the eye-lids, puffs up the ſcrotum, and all the looſer parts, with ſuch alarming rapidity, and is attended with ſuch oppreſſion of the breathing, as to terrify the patient; and the ſurgeon himſelf, though he knows it to be a ſlight matter, compared with the apprehenſions of the ſufferer, is yet not entirely at eaſe. In ſhort, it is a ſymptom which is ſo particular, and in ſome circumſtances ſo dangerous, that it requires a very full explanation.

When a rib is broken, the point of the broken bone is preſſed down upon the ſurface of the lungs and touches them: It abrades and lacerates the ſurface by the continual motion of the thorax; and it is often from the ſlighteſt and moſt ſuperficial wound of this kind, that the emphyſematous tumor proceeds; for, in moſt caſes of emphyſema, the laceration of the lungs is ſo ſuperficial, that it is not even attended with the leaſt degree of bloody foam from the mouth, or any other ſymptom of a deep wound; and if the pa-

tient die, the wound cannot be ſeen even after diſſection, but is only to be found by inflating the lungs: Yet the ſurface of the lungs being touched, even in this ſlight way, the air eſcapes from them at every inſpiration; the air which is then within the cavity of the thorax, is of courſe compreſſed, ſo that at the next expiration, this compreſſion muſt force the air either back again into the lungs, or out by the wound in the walls of the thorax, and ſo in among the cellular ſubſtance which ſurrounds the broken rib. Thus in every inſpiration there is a ſuction of ſome air, which is drawn through the wounded lungs, the air expands into the cavity of the thorax, the lung which gave out that air ſubſides again, and lies almoſt entirely quieſcent, partly from the wound in it, which, like a rent in a bladder, prevents it being inflated, and partly from the oppreſſion of the air within that cavity, where there ſhould be a vacuum to cauſe its diſtention; ſo that in the firſt inſpiration, air is drawn in through the wounded lung, in the next inſpiration it is breathed out through the wound of the thorax: Every new inſpiration draws more air from the wounded lung, and every new expiration drives more air out into the cellular ſubſtance; there is no further outlet for the air, which makes its way forwards, undermining the common ſkin with wonderful rapidity; ſo that the emphyſematous crackling tumor appears, firſt, over the broken rib, or over the wounded point of the thorax; then extends over the whole cheſt, (oppreſſing the breathing); then over the neck and

face, filling particularly the eye-lids, fo that the eyes are abfolutely clofed; then over the belly; then down the thighs; the private parts are at laft enormoufly fwelled; and no part efcapes this tumor, except the palms of the hands, and the foles of the feet:——more air is every moment drawn out from the wound of the lungs, and driven under the fkin; the patient is every moment more and more oppreffed; till at laft the breathing is quite interrupted, the pulfe flags, the extremities grow cold, and the patient, if he be not relieved by fome operation, muft die.

The philofophy of this difeafe, if I may be allowed to fay fo bold a thing, is quite mifunderftood; and it happens very ftrangely, that the moft palpable blunders are to be found in the writings of thofe who are looked up to as oracles on this point, and who boaft of their difcoveries, and claim them as their own, with an eagernefs which would imply fomething very important. But perhaps the eafieft form in which I can deliver this queftion to you is, by explaining firft in my own way the real condition of a wounded lung.

The moment that the lungs are wounded they fall down, and continue in this collapfed ftate until the wound heals, which it does in the courfe of a very few days: but from the moment in which the lungs are wounded, the ufe of the wounded lobe is loft, fo that if the wound be in the right fide of the lungs, the breathing is performed only by the left, only half the quantity of air is infpired, and the breathing is

difficult: But, this collapſed ſtate of the lungs, which cannot be remedied, which muſt inevitably continue at leaſt for a few days, while it is a cauſe of diſtreſs, is at the ſame time a chief means of ſafety. When the lungs are unfolded, their veſſels have their full diameter, they hold their full proportion of blood, and if, after being wounded, the lungs could continue dilating at every reſpiration, their wounded veſſels would throw out much blood; but the moment that they are wounded, they fall down to the back bone, they continue in this collapſed ſtate, and can no more be filled than a torn bladder can be inflated; and moreover, they are oppreſſed by the thorax being filled within with blood or air, and this collapſed condition of the lungs prevents much loſs of blood: There is leſs blood thrown out into the cavity of the thorax to oppreſs the lungs, and there is alſo leſs thrown into the bronchiæ, which is ſtill a more dangerous kind of bleeding, ſince it threatens ſuffocation, not only by filling the wounded lung with blood, but by affecting both ſides of the lungs.

If the lungs, when wounded, were to continue in perpetual motion, I do not know how we ſhould expect a cure; for the air would be continually ſtreaming through the wound, and the wound itſelf, alternately dilating and contracting like that in an artery, could not heal. But as the wounded lung lies in a collapſed ſtate, the edges of the wound are in contact with each other: There is, as we find by diſſection, a ſlight effuſion of blood, a degree of livor, a ſwell-

ing, thickening and inflammation round the wound, and thus, in two days, the wound heals. It is healed partly by adhesion, partly by this thickening of the cellular substance round its edges; and thus the lung becomes once more entire, and its function is restored.

The blast of air from a wound in the thorax, is often so strong, that at every breath it will extinguish a candle, and rushes with considerable noise. This strong blast of air, so far from being a sign of wounded lungs, is often strongest when the lungs are absolutely entire; it is a sign of a free and open wound in the thorax, but by no means of wounded lungs; for whether the lung be or be not wounded, the air enters so freely by the outward wound that there is no vacuum formed to give them play, and therefore they fall down and lie collapsed till the outward wound heal. The thorax therefore has nothing to do with the lungs, but is like a pair of bellows, having a large air-hole, which admits the air every time the breast rises; and when the breast falls again, that second motion blows it out. The air is alternately drawn in, and thrown out at every respiration, with a strong blast; but whatever air issues through the wound, had been drawn in by the wound, and had never passed through the lungs: There is no vacuum to move the lungs. The lungs, whether they be entire or whether they be wounded, always lie collapsed.

That the lung of one side which remains unhurt, is sufficient to support the system, we learn from va-

rious accidents: From thoſe caſes in which, either owing to the inciſions made by the ſurgeon, or to the nature of the wound, the cheſt has lain quite open, and the lungs of one ſide quite collapſed, and where the patient has yet lived in tolerable eaſe in the mean while, and recovered perfectly in the end. We learn it alſo from caſes of emphyſema, where the lungs are oppreſſed with air, and from caſes of empyema or pus, within the cavity of the cheſt, obſtructing the expanſion of the lungs; and eſpecially we are ſure of it from the very gradual decay of thoſe who die with large ſuppurations within the cheſt, in whom we find, after death, that on one ſide there remains nothing but one ſmall knob or tubercle of the lungs *.

That the breathing ſhould be eaſier in a free and open wound of the cheſt than in a punctured wound, or that in the caſe of a punctured wound, the patient ſhould be relieved by a free inciſion, no one needs wonder; for, in a punctured wound, there is no way for the blood or air to eſcape from the thorax, while yet at every ſtroke of reſpiration more and more blood and air is drawn out from the lungs, till at laſt

* Sectione ſuſcepta, dextrum pectoris cavum invenimus pure oppletum tenui, virideſcente, materia copioſa alba, quaſi ſebacea, dorſum imprimis et diaphragma verſus mixto, quæ a pulmone ſuppurato producta videbatur. Pulmonis verò ne VESTIGIO quidem reperto, aſperam arteriam inveſtigantes illamque ad bronchiorum diviſionem perſequentes, in mediaſtinum hanc abire conſpiciebamus. KOELPEN, *de Empyemate obſervatio*, p. 135, 136.

the blood, and especially the air, are ſo condenſed, that they not only oppreſs that ſide of the lungs, but by hindering the free play of the diaphragm, and loading the mediaſtinum, they oppreſs alſo the other lung, until at laſt the breathing, every moment more oppreſſed, falls lower and lower; the pulſe alſo ſinks in the ſame proportion; the extremities grow cold; cold ſweat bedews the forehead; and after great toſſing, and undeſcribable anxieties, the patient dies: But in a free and open wound, or when we make a free and open inciſion to relieve this diſtreſs, we relieve not the oppreſſed and wounded ſide, but the ſound ſide of the lungs, and all goes on tolerably well, till the inciſion heals, and the function of the wounded lung is reſtored.

If this reaſoning be juſt, then, inſtead of trying to get out the air, or hoping to reſtore the office of the lungs, we ſhould wiſh the lungs to lie in this collapſed ſtate; it is the beſt ſecurity againſt dangerous bleeding, their evolution is not abſolutely neceſſary for the patient's breathing, their continuing in this collapſed ſtate is the ſureſt means of healing the wounds in them. In ſhort, this collapſed ſtate of the lungs is one of thoſe happy accidents, inſeparable from the conſtitution of the part, which ſo obviouſly facilitates the cure, that we attribute it to a regular and fixed deſign of nature.

How impoſſible it muſt be to raiſe the wounded lung, and to renew its function, I think I ſhall now very eaſily explain, demonſtrating to you at the ſame

time, that thoſe who have intended this effect by their free inciſions, had not founded their diſcoveries as they have prematurely called them, on good principles; for Bromfield writes very ignorantly in that chapter, where he tries to reclaim the invention from Hewſon. Hewſon again is as vain of this trifle as if he were not rich in diſcoveries really honourable; and Mr Benjamin Bell, the moſt excuſable of all, follows them in the humble labour of gleaning and gathering up their miſtakes.

Firſt then, Mr Bromfield tells us, with great confidence in his own opinion, and great ſcorn of all others, "That the wound of the lungs being aſcertained, one WOULD not imagine that any perſon, ſkilled in the true cauſe of the complaint, and in the danger, with a thorough knowledge of the parts, could be at a loſs for an attempt *to relieve*; for in caſe an opening is made between the ribs, and a canula introduced, whoſe diameter is larger than the wound of the lungs, the air will be forced out as faſt as it eſcapes from the lungs, therefore the lungs will have *room* for their *expanſion*, and the danger of ſuffocation will be removed; and when once the wound of the lungs is agglutinated, and the canula withdrawn, the external opening will be healed without any difficulty *." The notion of the thorax being exhauſted of air, before, according to the author's expreſſion, the wound of the lungs is agglutinated, is curious. The expreſſion, "the lungs having room

* Page 91.

for their expanſion," is ſtill more curious: but if any one ſhould doubt whether the author could intend to ſay ſo fooliſh a thing, as that the lungs, not being oppoſed, will dilate of their own accord, let him turn over to the next page, where he will find a remark, coupled with a fact, which is moſt curious, *viz.* "I remember a ſimilar happy effect, in accelerating the cure in a ſimilar caſe by the PATIENT'S PLAYING on the HAUTBOY, which, keeping the lungs forcibly diſtended for a long while together, kept the pleura cloſer to the ribs, ſo that the union of the ſeparated parts, (*viz.* of the pleura and ribs), was moſt likely ſooner effected than if he had truſted to the ordinary reſpirations."

The celebrated Mr Hewſon hardly reaſons more correctly than his competitor Mr Bromfield *, who ſo kindly permitted him to make himſelf known to the Society. "It is natural," ſays Mr Hewſon, "to ſuppoſe, that the wound of the pleura and intercoſtals may ſometimes be too ſmall to ſuffer the air to get readily out into the cellular membrane, and to inflate it, but may confine a part of it in the cavity of the thorax, ſo as to compreſs the lungs, PREVENT THEIR

* Mr Bromfield ſays very candidly, "Though I ſhould have been ſorry to have prevented Mr Hewſon's making himſelf known to the Society, by a remark which he thought new," *&c.*; but Mr Hewſon had many ways of making himſelf known to the Society, which Mr Bromfield had *nothing* to do with: He was among the number of thoſe who ſhared the merit of that moſt beautiful of all diſcoveries, the Lymphatic Syſtem.

EXPANSION, and cauſe the ſame ſymptoms of tightneſs of the cheſt, quick breathing, and ſenſe of ſuffocation which water does," p. 347. Through all his paper we find him, in ſpeaking of oppreſſion of the lungs, referring only to that ſide which is wounded. He never once mentions the oppreſſion of the diaphragm, or the preſſure on the mediaſtinum, nor does he in any ſhape hint to us the oppreſſion upon the lung which is ſound; and, in the paſſage which I have juſt quoted, he ſays, that "the air within the thorax prevents the expanſion of the lungs;" and, in directing how the inciſion is to be made, he adviſes, that it be ſmall, rather than large, "for penetrating wounds of the cheſt are inconvenient, on account of the air's entering by the aperture in ſuch *quantities* as to prevent the *expanſion* of the lungs." The tendency of all this is very plain; but it is only in the writings of Mr Benjamin Bell, that one can have a perfect abſtract of this opinion, which all of them had ſome faint notions of, but which he alone has obtained in perfection. He ſays *, "In the chapter above alluded to we have mentioned different methods of expelling the air *from* the *ſurface* of the *lungs*, but the ſimpleſt and eaſieſt is this: While the wound yet remains open, let the patient, in a ſlow gradual manner, make a full INSPIRATION, by which a conſiderable quantity of the collected air

* P. 207.

will be difcharged *. This being done, the fkin muft be inftantly drawn over the SORE, fo as to cover it completely during EXPIRATION ; and if the wound be moderately opened during INSPIRATION, the whole quantity will be foon expelled." This receipt for expelling air from the lungs, comes very naturally from the author, by whom we are told, in the chapter alluded to, " that when a violent exertion in coughing, crying or laughing has produced it, (*viz.* burfting of the lungs) the particular feat of the complaint will, in general, be pointed out by fome degree of pain in the part where the rupture of the external coverings of the lungs *have* occurred."

Now, whatever intereft this author may have in perfuading his reader that laughing is dangerous, and that the lungs may be burft by immoderate laughing, I cannot forbear wifhing, that he had fatisfied us fo far, as to have mentioned at leaft one accident or fact of this kind.

* My reader, although he fhould be the mereft tyro in philofophy, will know, that when a man infpires with a wound of his thorax, if that wound be larger than the trachea belonging to that fide of the lungs, though he may by INSPIRING draw air into the cheft by the open wound, he can throw none out; in fhort, infpiration muft always draw in air, both by the opening of the cheft, and by the opening of the trachea, and expiration muft blow it out if it will go. INSPIRATION and EXPIRATION are the fame with regard to the opening of any wound, that they are with regard to the trachea : therefore Mr Bell has juft repeated a boy's leffon with a boy's fault in it, calling infpiration expiration, and expiration infpiration.

"The other means which we wiſh to propoſe (ſays Mr Bell) for drawing off air from the thorax, is Suction: An exhauſting ſyringe may be fitted with ſuch a mouth, of ivory or metal, as will allow it to be cloſely applied over the orifice in the pleura." And again he ſays, That "as much diſtreſs has, on ſome occaſions, enſued from both cavities of the cheſt being at the ſame time laid open, it ought never to be attempted." And the reaſon given for theſe inconveniencies, and the kind of danger that is apprehended, is not that the lungs of both ſides would collapſe, and breathing ceaſe, and the man die; but it is this, that the two cavities of the cheſt being laid open at once, and the air being admitted into both cavities at once, both cavities would inflame at once, and that would produce "MUCH DISTRESS." That it might produce much diſtreſs among his friends, I will readily allow; but as for the patient's own immediate diſtreſs, that, I believe, would be ſoon over and there would be little time for relieving him by ſucking up the air, with an elaſtic gum bottle, from "the ſurface of the lungs."

But the ſerious and plain concluſion is this, that the lungs will continue giving out air till they heal; that while they are giving out air, they muſt lie collapſed; that it is not deſirable that they ſhould be moved, for their lying unmoved is the beſt ſecurity againſt bleeding, and the ſureſt way of making the wound of the lungs heal: And ſtill further, we cannot, if we would, raiſe the wounded lung, nor renew its function; it is

rent ſo that it cannot be inflated; it is oppreſſed with air if the cheſt be cloſe, or if the cheſt be open, the air paſſes in ſo freely that no vacuum can be formed to move the lungs; and as for inſpiration emptying, and expiration filling the breaſt, it could never have been ſpoken of but by a perſon who could talk about the lungs being burſt with laughing. The inciſions which have been ſo much commended, are uſeful, not by raiſing the wounded lung, or renewing its functions; for that attempt is abſurd in all reſpects; it is needleſs, becauſe though a man does not live ſo eaſily, yet he does live, and does well with one lung only (I mean breathing only with the lungs of the one ſide) till his cure be completed: It is impoſſible to accompliſh it, becauſe the wounded lungs being ſtill open, the matter, air, or blood, iſſuing from that wound, fills the thorax, and prevents a vacuum: It is uſeleſs alſo; for it is, as I conceive, deſirable, that the lung ſhould lie collapſed and quiet till the wound in it heal; and, therefore, thoſe free inciſions, which I approve of as much as Mr Hewſon could do, are uſeful only where the breaſt is much oppreſſed with accumulated blood or air; and the inciſion which lets out that blood or air, alſo lays open the thorax, ſo as to let in the air freely, ſo that this free inciſion ſerves at once two good purpoſes; it makes the wounded lungs collapſe entirely, and ſets the lungs of the ſound ſide quite free, by relieving the diaphragm and mediaſtinum from the preſſure of extravaſated blood.

The practice then, in the cafe of emphyfema, fhould be this: 1*ft*, Upon obferving the crackling tumor beginning to form itfelf over a fractured rib, you fhould make fmall punctures with the point of a lancet, as in bleeding; and if the point be ftruck deep enough, the air will rufh out audibly. But, as this air was in the thorax before it came into the cellular fubftance, it is plain that the thorax is ftill full, and that the lung of that fide is already collapfed and ufelefs, and muft continue fo: The purpofe therefore of making thefe fcarifications, and efpecially of making them fo near the fractured part is, not to relieve the lungs, but merely to prevent the air fpreading wider beneath the fkin.

2*d*, If before you arrive, the air fhall have fpread to very remote parts of the body, as to the fcrotum, and down the thighs, it will be eafier to make fmall punctures in thofe parts, to let out the air directly, than to prefs it along the whole body till you bring it up to the punctures which you may have made on the cheft over the wounded part.

3*dly*, If, notwithftanding your free punctures, and your preffing out the air in this way, you fhould find by the oppreffion that either air or blood are accumulating within the cavity of the thorax, fo as to opprefs, not the wounded lung only, which was of courfe collapfed and ufelefs from the firft, but fo as to opprefs alfo the diaphragm, and through the diaphragm to affect the found lung; then a freer incifion muft be made through the fkin and mufcles, and

a ſmall inciſion made delicately into the thorax, to let out the confined air or blood.

4thly, If it be a gun-ſhot wound, it will happen more frequently in that than in almoſt any other, that the wound of the lungs will heal very eaſily; for though there be at the firſt a bleeding from the wound, and an emphyſematous tumor, a bloody foam at the mouth, a rattling breath, and apparent danger of ſuffocation; yet theſe very alarming appearances ſoon change: For in a gun-ſhot wound there is, from the bluntneſs of the ball, a ſort of laceration, attended with an immediate ſwelling of the wound in the lungs; there is an effuſion of blood, or an ecchymoſis all round that wound; the wound of the lung ſwells and cloſes; the lung is capable in ſome degree of inflation; the riſing of the lung keeps the wound of the thorax and the internal wound of the lungs ſo in contact, that they ſoon adhere. This therefore is a buſineſs which we ſhould not meddle with nor interrupt: If emphyſema extend rapidly from both the bullet-holes, then we may find it requiſite to dilate them; or if there be broken ribs, we may choose to get the ſplinters away: But if there be but a ſimple wound, no broken rib, no emphyſema, little difficulty of breathing, and little ſpitting of blood, we ſhould ſimply lay a piece of ſcraped lint upon each wound, put a gentle roller round the body, bleed the patient, and lay him quiet: for it has often happened, that a man thus ſhot through the lungs, from being apparently in

the moſt imminent danger, has been reſtored in a fortnight to the moſt perfect health.

IV. Of Extracting the Splinters of Fractured Ribs, Pieces of Cloth, Balls, or other foreign Bodies.

Our moſt immediate duty is, to relieve the oppreſſion of the lungs, by getting out the air and the blood, and next to enlarge the wound, and take away the ſplinters of fractured bone.

If a ball have broken the rib, the pieces of the bone will be eaſily felt with the point of the finger; the inciſions ſhould therefore be made ſuch as to admit the finger eaſily, and to ſet all the ſplinters free; the ſplinters of bone may be picked away with the points of the fingers, or looſened with dreſſing forceps; the fingers ſhould be put in to feel the courſe of the ball, or the damage it may have done; and you ſhould not at the firſt dreſſing believe your work entirely done; more ſplinters may be ſticking even in the ſubſtance of the lungs, ſupporting the ſuppuration, and cauſing a very pungent pain, and (juſt as in a fractured ſcull) you ſhould be continually upon the watch to obſerve whether there yet remains any depreſſed bones injuring the lungs, and ſhould endeavour in your daily dreſſings to feel them and to pick them out *.

* The introducing the point of the little finger, or of the fore finger, according to the ſize of the wound, does not interfere in

Befide the fplinters of ribs, there are pieces of the clothes to be accounted for, as alfo the ball when it does not pafs through. If there be a piece of any of the clothes wanting, as of the waiftcoat, and if there be a profufe fuppuration and increafing pain, it proceeds moft likely from that very piece of cloth having been carried in by the ball. In this cafe, we may put in the finger or a long probe to fearch for it; but it is by no means likely that it will be feen till the flux of matter wafh it (after long danger and fuffering) towards the wound. Yet we can in fome degree imitate this operation of nature; for a mild injection of tepid milk and water, thrown through the thorax with a rapid ftream, will at leaft fweep the thorax clean of grumous blood, and if practifed frequently at the time of dreffing, will (if affifted by a proper pofture) bring any piece of cloth to prefent itfelf at the wound.

As for the ball itfelf, if it be loft in the thorax, it is irrecoverably loft; and no method that we can contrive will enable us either to find or to extract it: The matter cannot raife it towards the wound; it will fall downwards upon the diaphragm, and either fettle itfelf, forming a fac there, or caufe a fuppuration; and when an empyema is formed, the incifion which lets the matter out will alfo allow the ball to drop.

any degree with our intention of clofing the wound with a comprefs; for the finger fhould always be introduced gently, and this way of probing fhould never be repeated, unlefs when we are fenfible of there being many fplinters of bone.

7. Of Supporting the Patient under the Profufe Suppurations.

The dangers of profufe fuppuration are next to be apprehended; for it very frequently happens, that after a wound, and incifions like thefe, not only the dreffings, but the very bed are drenched with matter, which, together with fever, cough, and violent pain, foon exhauft the patient. The firft danger of fuffocation is now over; the bloody expectoration has ceafed; the ftrength is reduced to the very loweft ebb, more, it fhould feem, by our bleedings than by the wound; and we are bound by every motive to fupport the patient through what remains of the cure. Now, as the cough is not to be appeafed by bleeding, we give large opiates to quiet it, and to procure fleep; we give bark, to keep up the fuppuration kindly, and to make the wound heal; and we try to fupport the patient's ftrength by foods eafy of digeftion, and efpecially by foups, jellies, and a diet of milk.

If it fhould unfortunately happen, that the wound clofes while all is not found within, the formation of matter will be foretold by fhiverings; the actual formation of it will be proved (as in any other abfcefs), by the ceffation of fever, and abatement of the pain; and, when it is fully formed, it will be felt by a weight upon the diaphragm, and anxious and difficult breathing; and thefe figns will increafe with the quantity of the matter, till at laft the matter can be felt by the patient himfelf, dafhing within as he moves:

The ſurgeon can diſcover it by tapping gently with his hand, and then alſo the patient will diſtinctly perceive, that he cannot ſleep but on the affected ſide. When all theſe ſigns appear, the operation of cutting the ſide ſhould be boldly done, it will give a temporary relief, delightful to the patient, after that kind of anxiety and ſuffering which is the moſt diſtreſſing of all to bear. Sometimes, no doubt, in this caſe we can accompliſh a cure, but too often the patient, exhauſted with the evening hectic and profuſe flow of matter, ſoon dies: he waſtes away as in a conſumption, and a few weeks cloſe the ſcene.

Thus have I conſidered the ſeveral points of practice, ſhewing you how to prevent ſuffocation, and to ſtop the bleedings in the lungs by profuſe bleeding from the arm; how to get out extravaſated blood, which lies oppreſſing the lungs, by enlarging the old inciſions, or making new ones, and introducing a tube; and how, by tying the intercoſtal artery, to ſtop that ſource of blood; how to diſpel the air of the general emphyſema by ſlighter punctures, and when to make freer inciſions in order to relieve the lungs. I have taught you how to pick away fractured bones; get out pieces of cloth; how to diſtinguiſh ſuppuration, and to perform the operation of empyema, and how to ſupport your patient under the vaſt diſcharge.

But I have been accuſtomed to add to this kind of general leſſon a particular repreſentation, as if of an individual patient lying wounded, ſuffering the agonies,

and ſtruggling through the dangers, of his wound, and happily in the preſent inſtance this manner of ſumming up the whole ſubject, makes a very ſhort and ſimple tale, not uninſtructive.

Suppoſe, then, that you are brought to a man, who, being ſhot through the breaſt, is ſtruggling for breath, and likely to die—you know that the great danger is from blood thrown into the cells of the lungs—you ſee him in danger of this ſuffocation; you know it by his high breathing, and by the bloody foam which iſſues continually from his mouth; you know that the only chance of reſtraining the blood is by bleeding in the arm, and you bleed him freely upon the ſpot. Then, in the courſe of a few hours, the emphyſema appears, which blows up the wound, extending along the breaſt, and increaſing in ſize with a rapidity which aſtoniſhes and alarms the patient—you then ſcarify, or rather puncture the wound, and preſs out the air; but if the lungs become every moment more and more oppreſſed, you dilate the wound, ſo as to lay the cheſt in a manner open, leaving ſo free an exit for the air, that the emphyſema cannot form again, nor the lung be again oppreſſed. This free inciſion admits your finger; you feel for ſplinters of bone, and pick them away; if the intercoſtal artery bleed, you ſecure it; if there be blood filling the thorax, which has come perhaps from the lungs, you get it out by changing the poſture of the patient, or by the help of a tube, and then you lay a piece of oiled lint within the lips of the wound; apply a large poul-

tice over all, and ſo compoſe your patient to reſt. At the next time of viſiting, you find him again labouring in his breathing; he has had a pungent pain in his breaſt, which indicates ſome ſplinter of bone ſtill pricking the pleura or lungs, and ſo at every dreſſing you let out blood, and when warned by pain, you always feel with your finger for ſplinters of bone: On the firſt day pure blood is diſcharged, and it runs freely: On the ſecond day ſtill there is emptied from the thorax perhaps a pound of warm blood mixed with clots: On the third day the blood is ſerous; and on the fourth, fifth, and ſixth days, the bloody tinge diſappears; pure ſerum ſucceeds to it, and pus again ſucceeds to the ſerum, till there is eſtabliſhed at laſt a regular purulent diſcharge.

From the 5th day the patient grows eaſier; from the 5th to the 10th day, the bloody expectoration gradually decreaſes, till at laſt it ceaſes altogether; from the 10th to the 20th day, the diſcharge from the breaſt decreaſes ſlowly, ceaſes at laſt, and allows the wound to cloſe. But many interruptions will often croſs you; the ſuppuration often flows in a continued ſtream, and waſtes the patient; the fever often riſes unexpectedly, with difficult breathing, oppreſſed lungs, and a profuſe diſcharge: Sometimes you will find this accounted for by the irregularities of the patient; but if ſuch ſymptoms return from time to time, or if there be a profuſe diſcharge, without any obvious cauſe, you muſt renew your ſearch for foreign bodies with all poſſible diligence; you ſee that the

ball has gone fairly through; you think that the ſplinters of ribs which you have drawn away, fully account for the ſize of the hole which you feel; ſtill, perhaps, you may be fortunate enough to diſcover one remaining ſplinter, which, however ſmall, may have been the cauſe of all this diſtreſs, or by waſhing out the thorax with milk and water, from time to time, (which you need not fear to do, when you know it to be full of grumous blood, or acrid pus,) you may get away a piece perhaps of the waiſtcoat, upon which the wound will quickly heal. Thus, by care and prudence, and a continual attention to the ſymptoms, and to the wound, you will have the happineſs of bringing your patient ſafe through all his dangers and ſufferings; thus the ways of nature and good ſenſe are ſo plain and eaſy, that nothing but a ſtrange deſire of wandering into whimſical and artificial practices can carry one aſide from ſo direct a line.

But that you may have warnings as well as examples, (and warnings are often of greater value than the beſt examples), I ſhall next preſent you, not with this fictitious repreſentation of an eaſy cure, but the real hiſtory of a caſe which I boldly hold up to you as an inſtance of the very worſt practice. I ſay boldly, becauſe I am venturing to criticiſe the practice of one of the firſt ſurgeons in France,—a practice acknowledged by the Academy of Surgery, and ſo, by implication, approved by all the ſurgeons of France.—I do not ſingle out this caſe through mere wantonneſs, but becauſe I think it really dangerous;—and when I ſhall have compared the bad practice, or what I think

the bad practice, with the good, your judgment will be settled in one important point, so that you shall not need to pin your faith upon the authority of any author, or number of authors.—You will then see clearly, and may choose whether you will abandon yourself to what I will call a presumptuous interference, or rather hold to the simple ways of nature;—whether you will keep the wound open by main force of setons or tents, or allow it to heal, if it will heal, expecting it to continue open naturally, if there should be any cause why it should not heal;—for although the wound should close upon some piece of cloth or splinter of bone,—such foreign body will produce matter, the matter will oppress the lungs, the oppression will require the operation for empyema; and that opening will allow at once the matter, and the piece of cloth, to escape.

An officer was brought to Mr. Guerin wounded by a ball, which had broken the 5th rib twice, entering before and coming out behind. Upon putting his fingers into each of the wounds, Mr. Guerin felt many splinters of bone. He dilated both with free incisions, and took away many splinters of bone. The patient coughed up much blood,—his extremities were cold,—his pulse suppressed,—and there was such fear of suffocation, that Mr. Guerin could hardly be blamed for having ordered three bleedings during the night; bleedings were repeated the next day, and the cough and bloody expectoration being abated by the 4th day, it was plain that the patient was saved for the time, and that he had a chance of life. But here is the fin-

gularity of the management of the cafe; Mr. Guerin, after dilating the wounds, introduced a feton, which, of courfe, went as fairly acrofs the breaft as a bowftring croffes a bow, and this feton he continued to draw with a perfeverance which is truly wonderful, from the firft day to the 38th day of the wound; during all which time the patient's fufferings were dreadful. "From the fifth to the fifteenth day (fays Mr. Guerin), I drew the cord regularly; for fifteen days the fymptoms were not diminifhed, and in thefe fifteen days I was obliged to bleed no lefs than twenty-fix times." From the fifteenth to the twentieth, his patient was a little relieved; from the twentieth he grew worfe, on account of a fudden movement of the army, being hurried onward to the city of Gand; from the twentieth to the thirtieth day he grew greatly worfe; by the thirtieth day Mr. Guerin had completed the number of twenty-nine bleedings, having bled his patient, by computation, every day, with the intermiffion of one day only. On the thirtieth day the attendant furgeon found himfelf obliged to bleed once more; and the fymptoms growing much worfe, confultations were called, and about the thirty-fecond day the feton was removed; on the thirty-third day the patient complained of a pricking pain, and they were fure fomething muft be wrong; they could not feel the fplinter of bone, but refolved, after mature deliberation, to cut up the fide; and accordingly, an incifion being made, which joined the two wounds, and was feven inches long, and the whole thorax being now laid open, they faw betwixt two of the ribs the

courſe of the ball along the lungs, and the groove which it had made in them. They found a piece of bone ſticking in the ſubſtance of the lungs, and having picked it out, this dreadful wound healed kindly, and the patient was ſaved.

From this caſe ſeveral reflections will ariſe, and you are already, I hope, ſo far ſurgeons, as to perceive that ſome ſteps of Mr. Guerin were bold and good, and what is ſtill more, were very ſucceſsful; but that the main ſtroke of his ſurgery here, viz. the ſeton, was very wrong.

You will notice alſo, in this caſe, 1ſt, How freely you ought to dilate every wound, more freely if there be fractured bones, and that all the ſplinters cannot be removed at once. 2dly, You will remark how uſeful the five bleedings in twenty-four hours were, towards ſaving this patient from ſuffocation; they were indeed the immediate means of preſerving his life. 3dly, You will find in this caſe a ſtrong proof of what I affirmed, that (after all that has been ſaid on this ſubject) there is no great danger in expoſing any cavity to the air. 4thly, You muſt remark, that where there is any very preſſing danger, you ought to venture every thing, and that the bold inciſion of Mr. Guerin, which laid the thorax ſo freely open, did ſave his patient's life.

But, on the other ſide of the account, ſtands every thing that relates to this fooliſh ſeton; for, had Mr. Guerin been aſked what good it was to do, it would have been difficult for him to have invented even a plauſible apology for a practice, which, if it was not doing good,

could not fail to do harm. Was this feton neceffary for keeping the wound open? No, furely; for the wound could not have clofed while it was irritated and kept in fuppuration by fplinters of bone, and a piece of cloth within the breaft. Was it to draw the piece of cloth out? Surely, in the courfe of twenty days, a piece of cloth would have had fome chance at leaft of being floated towards the wound, either by the natural flux of the matter, or by the help of a mild injection. Was it ufeful in fupporting the difcharge? This would have been a fore queftion for Mr. Guerin; for it fupported the fuppuration only by inflaming the cheft; and where inflammation of the cheft, or high cough, or bloody expectoration, or a profufe difcharge, were the chief dangers, a great feton could hardly be a comfortable inmate in the breaft. I think one might very boldly promife to produce bloody expectoration and terrible cough, profufe fuppurations and oppreffion, to any degree, by drawing fuch a cord acrofs a found thorax.

And it would be a forer queftion ftill to afk, why did this gentleman never feel this pricking piece of bone till the thirty-eighth day; did it ftrike or dart into his lungs only on that particular day? I fear the reafon of his not feeling it before, is but too plain; the pain of drawing this harfh feton acrofs the cheft was fuch, that it deadened every leffer pain, and he could not feel the trifling pricking of a bone till his greater fufferings from the cord were allayed.

In fhort, Mr. Guerin paffes a great ftrap of coarfe linen acrofs the cavity of the cheft, and when it caufes

high inflammation, he thinks to ſubdue it by bleeding;—when Mr. Guerin continued for thirty days drawing a coarſe ſeton through the breaſt every morning, and bleeding for the cough every night; what did he do, but raiſe inflammation with his left hand, to ſhow how well he could ſubdue it with the right? With this warning, which I am ſure you will underſtand in its true meaning, I ſhall conclude my obſervations upon wounds of the cheſt. But in leaving this ſubject, I cannot refrain from repreſenting to you, how cloſe the connection is between good practice, and the knowledge of parts. To an ignorant man all is wonderful,—to a well inſtructed man every thing is plain and eaſy; nothing paſſing within the patient, but what he calculates,—foreſees,—prevents,—knowing both the dangers, and the ſafety of the caſe. If the patient ſpits blood, he fears a wound of the lungs; —if there be an emphyſema, he is ſure of it;—if his patient be oppreſſed, he fears leſt there be blood within the cheſt; and when he puts in his finger, he is ſure of it, and relieves it;—if there be ſharp pains, he thinks ſome pieces of bone are ſticking in the ſide; and by ſearching for theſe alſo he gives relief;—if there be a violent cough, he apprehends inflammation; —if cough continue with riſing pain, he is ſure that inflammation is begun; if, with cough and pain increaſing, the patient is daily more oppreſſed, he is ſure the inflammation is then running dangerouſly high, and that his bleedings cannot keep it down;—if the patient be attacked with ſhiverings, he foreſees matter;—if evening hectic come on, his ſuſpicions are

confirmed ;—if the breathing grows daily more oppressed, he is sure of matter ;—when the patient rests only on the left side, he is sure that the left side is full of pus ; and having traced by symptoms only up to this stage, he strikes gently upon the thorax, and hears the matter dashing within ;—and thus, through all the stages of this particular wound, the man of real knowledge sees clearly every thing that is going on within.

DISCOURSE II.

ON WOUNDS OF THE BREAST.

You would obſerve, at our laſt meeting, that I had begun to repreſent to you the abſurdity of paſſing ſetons acroſs the thorax. You will, perhaps remember my late promiſe of explaining this matter more fully; and I would not diſappoint you of any explanation, that might be either intereſting or amuſing to you; but, more eſpecially, if ſuch explanation concerned any great queſtion, or could give you more determined notions, and a freer reliance upon your own judgment, in the affairs of practice; and I am perſuaded, that this will really be the effect of laying before you a ſhort hiſtory of ſetons and tents.

Formerly, in ſpeaking of ſetons, I obſerved, that for medicines to be introduced upon ſetons, one could conceive many which might be hurtful, but none that could be uſeful; and, as for promoting the pus and ſhaking the bones, they would ſurely promote pus, juſt as ſplinters or balls would do; and they would ſhake many bones which ſhould not have been looſened.

Yet these are the best reasons that the French surgeons have been able to assign; and these have been assigned only, because they had still a hankering after a practice, which had been handed down to them by their fathers, but which they felt, needed this kind of support.

When we come to search into this business, we find the history of it to be plainly this: that as Guy de Chauliac, Parée, and all the older surgeons, did not know how to dilate gun-shot wounds, they found these same setons useful in bringing the eschar sooner away, and in preserving an open wound; and as they believed the wounds to be poisoned, they took the opportunity of conducting, by these setons, whatever acrid medicines might, according to the prevailing doctrines of that time, have any chance of correcting the poison. This, as far as it regards the old surgeons, is a full and true account of the whole matter, and is in no shape deserving of farther notice; but the doings of the modern surgeons, especially of the French, deserves some farther attention.

It is curious to see them attempting to vindicate by reason, a practice founded on such prejudices as these; —it is very surprising to observe the cruelty and perseverance with which they used to draw these cords through the wounded limbs; and when the roughness of such a cord, or the acrimony of the drugs conveyed by it, produced a large suppuration (however painful), they were delighted with such proofs of their success.

We find the French surgeons passing their setons across the thickest parts of the limbs,—running them

up along the whole length of the fore-arm, and often, at the fame time, paffing them through the wrift joint,—loading them withal with acrid medicines;—no wonder then, that profufe fuppurations and dreadful fwellings came on;—but ftill they continued thefe cruelties, till the wound healed almoft in fpite of the pain, or till the coming on of very dreadful pain, great fuppurations, and fometimes of convulfions, forced them to defift from this piece of furgery, and to draw out their fetons, or fometimes to cut off the limb.

The French efpecially, artificial in their practice, have been addicted to this ufe of fetons: and have, from ftep to ftep, become fo familiar with them, that they have not confined the ufe of them merely to flefh wounds, but have paffed them, as I lately explained to you, quite acrofs the thorax,—acrofs the belly,—and through the great joints, as the knee;—and, in wounds of the head, have fupplied their place with long and flender tents.

When we want to fill up the fac of a hydrocele, or indeed to fill up the fac of any other tumor, what do we contrive, but either to lay it open with a large incifion, or to run a feton through it?—to fill it with fome acrid injection, or to cram it with a large tent? While the animal machine continues the fame, the fame ftimuli will produce the fame effects, and a feton injection, or long tent, if they produce pain and inflammation in the fcrotum, will not be eafy in the cheft; and unlefs we can ufe them in the cheft, with the fame intentions for which we ufe them in the hydrocele, unlefs it were our defign to inflame the cheft,

and to cause an adhesion of all the parts, we cannot use them with any consistency or good sense.

This simple reasoning against setons, is so conclusive, as to be a perfect refutation of the arguments used in their support; and, as for the matter of fact and experience, I have lately, in criticising the case given by Mr. Guerin, given you a pretty specimen of their practice, such as will set your conscience quite at ease, although you should be careless enough to omit the seton:—and I have selected this case, not because it was the most foolish of many foolish doings of this kind;—there are many pieces of surgery recorded as wonderful as this;—but because it stands very prominent among the College Memoirs, and is made an authority on this point.

To say that such patients recovered by their setons, is, in my opinion, no more than to say, they recovered in spite of their setons. It is like what happened to a surgeon, who was dabbling in the thorax with a piece of caustic, which fell directly into the cavity of the chest, where it caused very large suppurations, and yet the patient was saved.—The patient recovered in spite of the caustic, just as Mr. Guerin's patient, and many other poor unhappy souls, have lived in spite of the setons. One would think, that people took a pleasure in passing setons across the eyeball, the chest, the knee joint, &c. merely to make fools stare, when the business might be as effectually done with an abscess lancet*.

* If any one should wish to see the opinions of moderate authors, let him turn up the fifth volume of the System of Surgery, written

While I am thus reprobating the uſe of ſetons, ſurely that of the tents ſhould not eſcape. I know of no occaſion in all ſurgery, in which tents can be uſeful, except in the ſingle one of a narrow opening, which we deſire to dilate, in order to get at the bottom of the wound; and where either, on account of ſome great artery, or the fearful temper of our patient, we dare not uſe the knife; there a ſponge-tent will force open the wound. A tent for keeping an old ulcer open, is a downright abſurdity, ſince ſuch an ulcer will not cloſe; but, to fill a freſh wound with hard round tents, is juſt as bad ſurgery, and as unnatural, as the paſſing of a ſeton acroſs the wound.

The tents alſo of the French ſurgeons were often as careleſsly managed, as they were imprudently uſed:—Very frequently, tents uſed in wounds of the belly were loſt, occaſioned dangerous ſuppurations, and were in the end diſcharged with great pain and danger, at the diſtance of many months, or even years; and not unfrequently, tents, drawn in by the back-ſucking of the lungs, have got into the thorax, lain there unſuſpected, have occaſioned long ſuppurations, and even death*. Nay, ſtill more, tents, which had been uſed in dreſſing wounds of the thorax, have made their way into the ſubſtance of the lungs, and ſo been coughed up. Hildanus tells of a man†, who, having been wounded in the breaſt with a ſword, had been

by Mr. Benjamin Bell, where "Tents are EMPLOYED, prepared of dried ſponge, gentian root, and other ARTICLES; which, by ſwelling with the moiſture of the ſores," &c. &c.

* Vid. Ravaton, p. 221. † Obſervatio xiv.

long dreffed with tents, had efcaped from hæmorrhages, difficult breathing, and the other dangers, and his wound at laft healed up; but ftill he continued fpitting pus, till one day, three months after the wounds had clofed, he coughed up two tents, which had been ufed without threads to them.

And Tulpius* tells of a Danifh nobleman wounded in the German wars, who, after fix months of pain and danger, coughed up two tents, with which a wound in his cheft had been carelefsly dreffed;—and Pigrai, a pupil of Paræus, tells of a foldier, who, three or four months after his apparent cure from a wound of the breaft, fpit up a large piece of his rib, of confiderable thicknefs, and, if my notes are correct, of no lefs than three inches long.

But if there was alfo knavery in this way of ufing tents, that fufpicion ruins at once all authority of the older furgeons; and La Motte declares roundly, that there was almoft as much of knavery as ignorance in this practice. "For I have obferved (fays La Motte), one of your old mafter furgeons, in place of curing a wound of the belly in a few days, perform long incifions, cram thofe incifions with tents, and confine his patients for fix months, making a pretty hundred crowns, and much reputation to himfelf, out of a very fimple matter:" fo that ignorance and folly begot this practice; and when it was grown up to ftrength, knavery leagued with folly, and profited as occafion ferved.

One thing more I muft fay concerning this old

* Obferv. xv.

piece of ſurgery, that they were not nice about the materials of which their ſetons or tents were made: for a ſeton they uſed in general a piece of good ſtout tape or garter; they often took a long ſtrip of linen, and named it a ſyndon; and as for their tents, they made them out of any thing that was large enough, ſtrong enough, and hard enough; and La Motte, who had been often witneſs to theſe operations, avers, that they would very willingly have taken the help of a hammer to faſten them in, if they could but have done ſuch a thing ſecretly or without ſhame; and here alſo they were quite delighted with ſeeing prodigious quantities of matter ſpouting out when they drew their ſpigot away.

Having ſettled this point, and confirmed you, I hope, in your abhorrence of any thing in practice ſo harſh and unlike the ſimple ways of nature, I will rerurn to my ſubject of wounds of the breaſt; for as yet I have deſcribed merely the wounds of the lungs. I muſt alſo ſhow you what are to be the conſequences of wounds in the heart, or in the diaphragm, or on the outſide of the cheſt.

Wounds in the left ſide of the breaſt are more dangerous than wounds in the right, on account of the heart's being there; and a wound through the left ſide of the breaſt, followed by faintings, difficult breathing, coldneſs of the extremities, ſuppreſſion of the pulſe, with great anxieties and deadly fear, are very certain ſigns that the man is wounded in the heart, and is about to die; and there is ſufficient time for theſe ſigns to appear, for it is not always at the moment that the

patient dies. One man being wounded with a ſword, the point of it cut the coronary artery which threw out its blood ſo ſlowly that it was two hours before the pericardium was filled with blood; and then, after great anxiety, the patient died. In another ſoldier, the apex of the heart was cut with the point of a very long and ſlender ſword; and this ſoldier lived twelve hours, during which time, as appeared after his death, the heart had, at every ſtroke, been loſing a ſmall quantity of blood, till it had, in twelve hours, entirely filled the cheſt, and then the patient was ſuffocated and died.

But indeed, there is ſo little to be done in ſuch a caſe, and the ſigns and the conſequences of ſuch a wound are ſo clear, that it were a waſte of time to ſpeak longer of wounds of the heart. Wounds of the diaphragm are alſo out of reach, and all that you can deſire is, to know what ſort of accidents have happened to the diaphragm; and whether, after a wound of that important muſcle, the patient will live or die. Though wounds of the diaphragm are not material in themſelves, yet the diaphragm can hardly be touched, but in mortal wounds, *i. e.* in wounds touching both cavities, *viz.* of the thorax and of the abdomen, where moſt frequently the ſtomach, lungs, pericardium, or heart, are either wounded or are ſoon inflamed, and ſo drawn into diſeaſe. But there are ſome very curious caſes, where the patient recovered from the preſent wound, and died not till ſome months or years after, by what I may call a thoracic hernia, the bowels paſſing upwards through the diaphragm into the breaſt.

Parée defcribes his diffection of a mafon's boy, who being wounded in the breaft, died on the third day; and upon opening the body, at firft fight, he thought he obferved a phenomenon which he could not eafily believe; he thought the ftomach wanting; he went onwards fearching with particular care, until at laft he found the ftomach, not in the belly, but in the thorax, inflated with air; and he found that it had paffed upwards, by the wound in the centre of the diaphragm, through a hole no bigger than to admit the thumb.

But there follows in Paræus, a much more fingular cafe, and a very interefting one: a M. d'Allon, in the fuit of the M. de Biron, grand mafter of the artillery of France, was wounded before the city of Rochelle, by a ball, which, entering at the lower end of the fternum, paffed out again betwixt the fifth and fixth ribs. This wound was, you perceive, of the moft dangerous nature; for it paffed clofe over the ftomach, which, had it been full, could not have efcaped. The ball could not fail to wound the diaphragm,—it muft alfo have paffed through the lungs, and yet he was cured of his wound, but with an infirmity remaining, which could not be accounted for, till after his death, which happened in about nine months. He was to all appearance cured of his wound, and apparently out of all danger from any confequence of it; but ever after it, he had a weaknefs of the ftomach, with frequent colics, and never durft make a hearty meal for fear of an attack. In the eighth month after his wound, he had a dreadful attack of this habitual colic, of which, notwithftanding every exertion, he died; and

when his body was opened by the celebrated Guillmeau, there was found in the cavity of the thorax, a great turn of the inteftine colon, much diftended with wind in the proper condition of a hernia, and much ftrangulated, you may fuppofe, fince it occafioned the patient's death. Indeed, the hole in the diaphragm was fo fmall that it fcarcely permitted the point of the little finger to pafs.

Wounds of the fternum fhould not be paffed over in abfolute filence, fince thefe alfo may come under your care. I have formerly taught you, that when wounds and fractures of the fternum caufe inflammation, and are followed by a collection of pus, there is formed a cavity under the fternum, which did not naturally exift; and however much the operation of trepanning, in this cafe, may be queftioned in theory, the fact is, that you are fometimes forced to trepan; and for this there needs no better authority than that which we have from Galen, in his feventh book (of Diffections).

A fervant of Marilus who had received a blow upon the breaft-bone neglected it at firft; but there appeared in four months after, a collection of matter upon the fternum, which his furgeon for the time opened and healed; but it foon inflamed, again proceeded to abfcefs, was again opened,—but it not healing, a great confultation was called (and Galen, among others): the breaft-bone was entirely rotten, the beating of the heart was feen on the left fide of the difeafed fternum, which frightened the phyficians from undertaking his cure; but Galen was contented to take this upon himfelf: he adventured to cut the whole of the cor-

rupted breaſt bone away; the bone adhering to the point of the heart-caſe or pericardium, that alſo was of courſe cut, and the heart expoſed quite bare. They deſpaired of curing ſuch a wound, and yet the patient was in the end perfectly reſtored. Here, then, we have upon that authority, which has been always reſpected, a caſe exceeding, in the miraculous, all that has ever been recorded by the patient Vander Wiel, or gathered by Shenkius, or any German commentator among them. A man with a ſlow ſuppuration, confined matter, a carious ſternum, and the heart abſolutely expoſed and bare.

The ſternum may be thus fairly undermined with matter, ſo that where thre is truly no natural cavity, a very deep one may be formed; of which we have a curious example recorded by La Motte, of a ſoldier, who, being wounded at the middle of the ſternum with the point of a ſword, felt no pain nor difficulty of breathing for ſome time, as if it had not reached the cavity of the cheſt. La Motte bled the man, and dreſſed his wound very ſimply; but at laſt the inflammation and oppreſſion did come on; and one day in lifting the dreſſing, a large glaſsful of good pus ſpouted out, and then probing, he found that his probe went down very deep into the breaſt; but the matter came gradually in leſs and leſs quantities, till at laſt it ceaſed, and the wound cloſed.

You perceive that I have carefully gone through all the poſſible wounds of the breaſt; for I have given you leſſons upon wounds of the lungs, wounds of the heart, wounds of the diaphragm, and wounds of the ſternum; but there is one thing I am much concerned

in obferving to you, for it will regulate the prognoftic that you are to make, and will alfo be a rule of fome importance to you in the cure itfelf: it is that, in the firft place, you are never to pronounce any wound mortal unlefs it be plainly a wound of the heart; for the recoveries which men make after the moft defperate wounds of the lungs, are truly furprifing; and, next, you muft be careful to diftinguifh wounds of the pectoral mufcle, fhoulder, or fcapula, from wounds of the breaft; for, were you not warned of this fingularity, you would be inclined to believe that a wound had paffed directly acrofs the breaft, when in fact the ball, or weapon, had only turned round the breaft and done no harm.

I fhall now, in conclufion of this fubject, reduce all that is important into the form of aphorifms or rules, fhowing the feveral degrees of danger, and the feveral ways of giving relief. And there is no fubject on which I more willingly beftow this degree of labour; for this bufinefs of wounds of the breaft is important; and it might, if I fhould leave it without faying more, appear fomewhat confufed.

1ft, If the patient lie oppreffed, toffing, infenfible, —his face ghaftly, and his extremities cold,—his condition is very doubtful; it looks much like a wound of fome veffel, near the root of the lungs; and if fo, he is furely gone.

2dly, If the oppreffion come on more flowly, the

pulſe only hurried and fluttering, and the extremities not ſo cold, there is reaſon to hope, that his wound is merely in the edges of the lungs; and, as it is at a diſtance from the great veins and arteries, he may eſcape.

3dly, If ſpitting of blood, and the emphyſema, or windy tumor come on, unqueſtionably he is wounded in the lungs; but that wound is not always fatal:—It either the blood do not flow in upon the lungs in great quantity, or if, by our profuſe bleedings, that bloody exudation into the lungs can be reſtrained, then he may be ſaved.

4thly, If, when there is much oppreſſion, we put our finger into the wound, let ſome blood out, and ſo give relief, we are ſure that the ſuffocation proceeds from blood extravaſated in the thorax; and that kind of ſuffocation we know to be leſs dangerous by far than that proceeding from blood poured into the proper cavity or cells of the lungs, *i. e.* into the air-cells, into which we draw the breath, and which, while they ſhould be filled with air, are choked with blood.

5thly, If a bullet paſs fairly through and through, the patient is ſafer: he is in great danger, if it ſtop, whether within the thorax, or in the lungs; for when it paſſes through, as ſoon as we have ſaved him, by bleedings, from the firſt dangers, he is ſaved: But while it remains within the cheſt, he is expoſed to tedious ſuppurations, incurable ſores, hectic, waſting, and death; and nothing ſo wearies the ſurgeon, or depreſſes the patient's hopes, as an unceaſing flow of matter, and a fiſtulous ſore; nor can any thing be

more diſtreſſing to the ſurgeon than the ſeeing a patient ſlipping through his hands (to uſe ſo vulgar a phraſe), more eſpecially, if, during a lingering diſtreſs, he has thought it neceſſary to ſupport the friends with hopes and promiſes; for then it falls peculiarly hard on all concerned;—on the ſurgeon, who has ſuggeſted, or allowed ſuch hopes, as well as on thoſe who have permitted themſelves to be thus deceived.

I ſhall next, after what is commonly called the prognoſis, explain to you in another ſet of aphoriſms, how you ſhould conduct the cure.

1ſt, I think you will not eaſily forget, that ſword or bayonet-wounds, often need no dilatations; and that the ſecret dreſſing, as it was called, or ſucking the wounds, or in plain terms, the cure by adheſion, had been, in ſuch caſes, attended with wonderful ſucceſs.

2dly, You know that gun-ſhot wounds require dilatation more frequently, from the peculiar nature of the wound; and that ſuch inciſions muſt be particularly large, when you are ſenſible, that there are many ſplinters of the ribs to be extracted; that there are pieces of cloth driven in; or that there is much blood lying upon the diaphragm and lungs.

3dly, You will remember, that the firſt and great danger is that of ſuffocation, from blood poured inwards to the trachea, and into the cells of the lungs; —that it is your duty to keep the patient low, and to drain his ſyſtem ſo thoroughly of blood, that none ſhall paſs towards the lungs to ſuffocate him;—and that there may not be blood enough in the ſyſtem to ſerve as fuel for that inflammation, which, ſooner or

later, muſt come on, the exceſs of which is thus provided againſt, without any particular rule.

4thly, The next great danger is of blood within the thorax, oppreſſing the lungs. It may perhaps be gotten out, by laying the head and ſhoulders out of the bed, making the patient heave and ſtrain for its diſcharge; but theſe are rather the attempts of leſs regular or ſkilful ſurgeons, while a man of real ſkill boldly puts his finger into the wound, or introduces a tube, or makes a new wound, if the firſt be too high in the thorax; and he makes his wound ſo free as to have it in his power to tie the intercoſtal artery eaſily, if it be from it that this blood has come.

5thly, The emphyſema is the ſymptom the moſt alarming, and yet the leaſt dangerous of all; it advances ſo faſt, covers the cheſt ſo quickly, blows up, at laſt, the neck and face, and is, withal, ſo ſtrange a ſymptom, that the patient is terrified, but the ſurgeon cannot be alarmed;—he knows the ſymptom, and how trifling it is;—ſcarifies the wound, preſſes out the air, and makes the paſſage for the air ſo free, that it cannot collect again.

6thly, The ſurgeon, never free from anxiety during the cure, watches the breathing, the cough, the fever, and the condition of the wound; keeps an eye upon all theſe points at once; and when there is a pricking in the ſide,—when there is any aggravation of the cough,—when there is an increaſe of the diſcharge, inſtantly his fears are excited for his patient's ſafety;—he probes the wound, feels it with his finger.—waſhes the thorax with an injection,—is at infinite

pains to find any little piece of bone that may be touching the lungs,—and tries to hook out any piece of cloth with his probe, or to float it towards the wound, by a mild and warm injection.

7thly, Senſible, at every turn, how ſlight a matter will iritate the pleura and lungs, he will never allow himſelf to do ſo unnatural and cruel a thing, as to paſs a great cord acroſs the cheſt, which is thus eaſily irritated by the moſt trifling piece of bone, or rag of cloth; but merely lays a bit of oiled caddis gently within the wound, with a large emollient poultice over all.

8thly, And he muſt learn to play the part of ſurgeon and phyſician at once; and very fit it is, that the man who is managing the wound, ſhould guide the ſyſtem. Let the ſurgeon then lay aſide all apprehenſions, and all theory about fevers, and commotions of the ſyſtem, to attend to the ſingle duty of managing the patient's ſtrength,—whom he muſt bleed, in the firſt inſtance, almoſt to death,—bleeding not according to his own prudence, but according to the exigencies of the caſe. He muſt repeat his bleedings, whenever bloody expectoration returns;—whatever lengths that threatens to go, he ſtill muſt go before it, and prevent ſuffocation, by draining the ſyſtem of blood.—He bleeds, then, in the firſt days, not according to his diſcretion, but according to the exigencies of the caſe, againſt his will, reckoning to pay dearly for the preſent bleedings in ſome future period of the cure; and when the time comes, in which the oppreſſion is forgotten, and the danger of ſuffocation,

and the bleedings from the lungs are over, he begins to ſupport his patient's ſtrength with opium and bark,—and nouriſhing diet and milk;—and then the ignorant friends begin to blame him for thoſe very bleedings which really ſaved the patient's life; then only he feels within himſelf the value of all his former care of his patient; "he is ſo ſtrong built up in honeſty, that peeviſh words paſs by him as the idle wind, which he regards not."

DISCOURSE III.

ON WOUNDS OF THE BELLY.

Every wound is a diſeaſe, and every diſeaſe varies according to the conſtitution of the parts affected, and according to the offices which the parts are deſtined to fulfil. In the abdomen, the principles which explain its diſeaſes, are extremely ſimple and plain: we find the chief cauſe of danger to be the tendency of the peritoneum to inflame; we find every wound apt to excite this inflammation, and every inflammation, however ſlight, apt to ſpread, to extend itſelf over all the viſcera, and terminate in gangrene and death, Upon theſe grounds, we cannot but pronounce a wound of the belly to be a mortal wound.

There are a thouſand occaſions on which this delicacy of the peritoneum may be obſerved; the wound of the ſmall ſword, and the ſtab of the ſtiletto, explain to us how quickly the peritoneum and all its contained bowels inflame by the moſt minute wound, although it be almoſt too ſmall to be viſible on the outſide, and ſcarcely within; for often upon diſſection no inteſtines are ſeen to be wounded, and no fæces have eſcaped

into the abdomen. In thofe who die after lithotomy, we find the cavity of the peritoneum univerfally inflamed;—the operation of Cæfarian fection is fatal, not from any lofs of blood, for there is little bleeding; nor from being expofed to the air, for they alfo die in whom the womb burfts, and where the air is not allowed to enter; but merely from that inflammation which fucceeds to wounds of the peritoneum, fmall as well as great, of which we have fometimes a melancholy proof in the operation of hernia, in which the ftitching the wound according to the whimfical improvements of fome modern furgeons, or where the mere tying of the fac, as in the practice of the old rupture-doctors and caftrators, often raifed fuch inflammation as fpread very quickly over the abdomen, and ended in gangrene.

The firft principle, therefore, and the thing moft to be fpoken of in explaining wounds of the belly, is this tendency of the peritoneum to inflame: and the caufe which immediately excites this inflammation muft be ftill more noticed. For though this inflammation may no doubt come on from the flighteft fcratch in the peritoneum itfelf, yet, in general, it arifes rather from the wound of fome one of the vifcera: If an inteftine be wounded, it pours out its fæces into the abdomen; if the liver, fpleen, or kidney be wounded, thefe pour out blood; if the bladder, then the urine filters into the cavity of the belly. The food, or fæces, or urine, or blood, are as foreign bodies lying in the cavity of the abdomen, which no activity of the abforbents can remove. They remain there as foreign bodies, which

ſoon cauſe inflammation; there follows a knotting together, and great diſorder of all the inteſtines attended with intenſe vomiting, excruciating pains, hickup, a quick, weak, and fluttering pulſe, mortification of the bowels, and then a low delirium cloſes the ſcene.

Wounds of the head are deadly, from the oppreſſion of the brain; and there delirium or coma are the deadly ſigns. Wounds of the breaſt are fatal, by the oppreſſion of the lungs; and there difficult breathing, toſſing, coughing of blood, coldneſs of the extremities, and a faultering pulſe, are the mortal ſigns. Wounds of the abdomen are mortal, by the inflammation and gangrene; and the ſigns of danger are, ſwelling of the abdomen, intenſe pain, vomitings, coſtiveneſs, hickup, faintings, then an interval of deceitful eaſe, which is merely a ſign of internal gangrene, and of the near approach of death.

Thus you perceive that a lecture on wounds of the abdomen muſt be a lecture on inflammation of that cavity, and of the various ways in which it is produced. It is alſo but too plain, that here we are ſpectators merely, or with kinder thought of watching over our patients, and doing the little that art can do; but that in general we have no other privilege than that of pronouncing whether he is likely to live or die. This alſo muſt be remarked, that while laying down the general principles, we would be ready to pronounce every wound of the abdomen muſt be mortal; but when we deſcend to the particular caſes, we have ſuch ſtrange examples of unexpected cures, that we are ready to retract our firſt poſition, believing that hard-

ly any wound is deadly; and the reaſon of this deception muſt alſo be obſerved. Having put it down as a prognoſtic, which is but too well confirmed, by much melancholy experience, that wounds of the belly are mortal, there is no reaſon why we ſhould, in recording our caſes, take any note of a man having died after ſuch a wound; death, from ſuch a wound is a daily and expected occurrence, and therefore it is not marked; but, if we find that a man has eſcaped, are we not to record every ſuch eſcape? Is it not our duty to ſet up and marſhal in fair array all the poſſible wounds, to mark out which are poſſibly ſafe, and which are abſolutely mortal; to diſtinguiſh the various accidents of all the various wounds; and to try whether by ſuch obſervations we can leſſen their dangers? Thence it comes to paſs, that, in one ſhort ſentence, we announce the general principles of ſuch wounds,—in one ſhort and general prognoſtic we declare them to be fatal; we thus beſtow but a few moments on their general character, while we ſpend hours in marking their leſſer varieties, and in recording all the accidents and chance cures, collecting evidence about hair-breadth eſcapes, till we almoſt loſe ſight of the general principle which proves ſuch wounds to be mortal. This confuſion muſt be peculiarly felt by a diligent ſtudent, who, the more he reads, the more he wanders, finds anuſes at the groin, and miraculous recoveries in every book, and reads of cures, till he forgets that there are dangers.

In judging of wounds of the lower belly, much muſt be taken into account before we form our opi-

nion. We are often likely to be deceived; we fee the patient lying quiet and eafy, while we know that he is on the very brink of danger; and there is often great confufion and alarm when the patient is abfolutely fafe: for balls fometimes turn fo, that a fhot fhall pafs through among all the bowels, without wounding one; though it muft be acknowledged, that the belly is fo full of parts effential to life, that there can hardly be a wound of the abdomen in which one or other of the bowels is not concerned.

Our patient feels little in the moment of the wound, fave that confufion, trembling, and alarm which is the immediate confequence of fear, but which is allayed by time and a flight opiate, or a cordial draught.

If ftools come on foon after the wound, and if the belly continue regular and eafy but for a few days, it is a comfortable affurance (or it is almoft an affurance) that the bowels are unhurt.

If, on the fecond, third, or fourth day, a fwelling, pain, and burning fever come on, if foon after there come dreadful torments, then the belly is completely inflamed, and the danger very great; the bowels will mortify, and the patient being fuddenly relieved from pain, will be eafy for a few hours, and will fink, after this deceitful interval, into a low and muttering delirium, and die.

If this threatening inflammation be kept off by profufe bleeding, by low diet, and by abfolute reft; or if it be thus fubdued after having begun, then the chief danger is over, and the patient is in fome degree fafe.

Yet ſometimes the belly is eaſy, and the bowels regular for ſome days, when moſt unexpectedly fæces appear at the outward wound; which accident throws us back into great conſternation; it is a ſign of great danger; for often, though the bowels are wounded, yet from their emptineſs, or the cloſeneſs of the wound, or from vomiting, or by ſome other chance, the fæces are not at firſt diſcharged through the wound. And again, though the belly continuing regular and eaſy for many days is no doubt a proof that the inteſtines are not wounded, it is by no means a perfect ſecurity that they are not hurt; for the ball may have bruſhed through among them with ſuch velocity that the inteſtines may be be bruiſed like the external wounds, the hurt parts of the inteſtines may ſlough off, and the inteſtines opening from ſuch a cauſe, on the ſixth, eighth, or tenth, or fifteenth day, will pour out their fæces into the cavity of the abdomen. The ſigns of theſe two kinds of injury to the inteſtines are very plain; for, if there be a direct wound of the bowels, there will be an immediate interruption of ſtools, immediate ſwelling of the belly, vomiting, hickup, and death: or, on the other hand, there may come, after many days of free paſſage in the belly, a ſudden interruption of the ſtools, with as ſudden a ſwelling and hardneſs of the belly, then vomiting, hickup, and death; and then we find upon diſſection, that this ſudden death has been from a gangrene of the bowels, which had been bruiſed in the rapid paſſage of the ball, the eſchar of that gangrene not breaking till the eighth or tenth day.

Since, then, this flough of the bruifed inteftines will fall out about the time of the inflaming of the wounds, we never can be without great anxieties about our patient's fafety, till after the floughing of the wounds is over: and even then our patient is only in fome degree, but not entirely, fafe; for there is another danger ftill:

The two wounds, viz. the entrance and the exit of the ball, being gun-fhot wounds, continue dead and callous for five or fix days; then the bruifed parts recover their action,—inflame, fwell, and throw off their putrid floughs. It is but too plain, that this inflammation of the external wound may be communicated to the whole cavity of the abdomen, and the inflammation of the abdomen may be thus renewed. This alfo, is to be guarded againft; and therefore we do not relent in bleedings, low diet, perfect and abfolute reft, till the fifteenth or twentieth day.

If, unhappily, the ball has not paffed through, but remains fomewhere within the abdomen, other fears and dangers await us, which bring to our remembrance, the aphorifm concerning wounds of the thorax, that " while the ball remains within the thorax, the patient, though faved from the firft dangers, is expofed to tedious fuppurations, incurable fores, hectic, wafting, and death;—and nothing fo wearies the furgeon, nor depreffes the patient's hopes, as an unceafing flow of matter, and a fiftulous fore."

Here, alfo, the patient is peculiarly expofed to wafting fuppurations, and to ftill greater dangers. The ball, if it have entered near the navel, or upon the

middle line of the belly, will ftick in the lumbar vertebræ, and will caufe paralyfis of the bladder and lower extremities, foon followed by death. If it have paffed obliquely through the abdomen, or to one fide of the middle line, it will lodge in the thick flefh of the Iliac, or Pfoas mufcle; and the patient after having paffed through the firft dangers, feels little more than a weight and wearinefs of the loins; but when he raifes himfelf to fit up in the bed, the wearinefs is converted into pain. Sometimes the ball makes a bed for itfelf, and lies harmlefs in the loins;—fometimes alfo, if the fhot has entered near the pubis, by paffing over the thigh, and has gone obliquely upwards, there is a frequent draining of matter, and a fmall fiftulous fore; but moft frequently of all, the outward wound clofes, the patient is never relieved from a dull and heavy pain, never recovers the free ufe of his limbs, nor is able to fupport his body erect, but waftes under a flow hectic fever; and when he dies, there is found a great abfcefs in the loins.

Sometimes a ball, paffing obliquely, not from below but upwards, from above downwards, enters the belly, breaks fome of the bones of the pelvis, paffes out perhaps through the middle of the haunch bone;—and there a very free dilatation is required, both to make an open wound, and to take away the fplinters of fo large a bone, and to prevent matter forming within the pelvis, and inflaming the abdomen.

Sometimes a ball, entering over the thigh, and near Poupart's Ligament, or about the ring, feems to pafs into the abdomen, while, in fact, it goes behind the

peritoneum, courſes along the bones, lodges about the Ala Ilii, or perhaps goes ſo high as the loins. There the inflammation is ſubdued by bleeding, and never reaches the abdominal cavity; or if it threaten to do ſo, it is eaſily reſtrained; a fiſtulous ſore enſues; at times it gleets profuſely; then it ſtops, with ſwelling and pain, not without danger; again it burſts out, and runs freely, and pieces of cloth, and fractured or ſpoiled bones are from time to time diſcharged; the finger, or probe, are ſometimes introduced in ſearch of the ball; ſometimes we feel an indiſtinct rub, as in ſounding for the ſtone; then it diſappears; then we feel it again; and again it diſappears; till at laſt, in a lucky hour, the ball preſents itſelf at the groin, and is pulled away. In all this, there is an appearance, of the ball's changing place, ſo ſtrong, as to encourage us to try at laſt what poſture will do; for turning often upon the belly has actually brought ſuch balls towards the groin; which need not ſurpriſe us, when we ſee balls not lodged, as in this caſe, among a looſer cellular ſubſtance, but, in the ſolid fleſh of the limbs, work downwards by poſture, and their own weight.

Often, when balls go down into the pelvis, they are fatal by the wound being in the bladder, and the urine getting into the abdomen; or by cauſing a high and gangrenous inflammation; or by the thickneſs of the bones that are broken, producing long ſuppuration, and an incurable ſore: But ſometimes the firſt inflammation being ſubdued, ſuch balls lodge about the bones; and we can neither conceive where they can be ſo effectually concealed, nor how they can lie

there without danger or pain.—Sometimes, however, the ball lies loofer, falls down into the bottom of the pelvis, and produces tumor there; and once Mr. Boerdenave, after fuch a wound, feeling a fluctuation in the perineum, made a lithotomy-like incifion, and got out fome pieces of fhirt, much urine, much clotted blood, and the ball, fo that his patient was perfectly cured.

Having fpoken of this inflammation of the peritoneum, as the chief caufe of danger, let me next explain to you, how this fame inflammation is alfo (by caufing an adhefion of the wounded bowel) the only means of fafety; for if a wounded or difeafed bowel were to continue but a few hours unattached to the abdomen, it muft be fatal. If the liver be inflamed, it adheres to the peritoneum; their fubftances are fo mixed, that they become as one, and then the pus, gathered within the fubftance of the liver, inftead of being poured out into the abdomen, makes its way outwards, and fo the abfcefs burfts, or is punctured, and heals. In dropfy of the ovarium, we fhould not dare to tap the patient, left the inteftines fhould be betwixt the integuments and this dropfical fac, but that we know, how the fac of the difeafed ovarium unites itfelf, by inflammation, to the inner furface of the peritoneum, as foon as they touch each other. If a fœtus be conceived in the ovarium, or be by laceration thrown out of the womb, the woman, if fhe furvive, is freed from her burden by the fac which enclofes the child adhering to the inner furface of the abdomen, where abfcefs forms, and the fœtus is

expelled piecemeal, bone after bone, till the whole is difcharged. In hernia, an adhefion of this kind faves the life; for the inteftine, which is hurt in the ftricture of a hernia, is ftrangulated, inflames, mortifies and burfts; and then it would go back into the belly, caft out its putrid fæces there, and fo prove fatal, but that the gut always inflames before it mortifies; during that ftate of inflammation, it is hard driven into the ring; there it is fixed, adheres, is ftraitened more and more, till the mortification is complete. But obferve how this is effected; all that is below the ftricture mortifies; all that is above it is found; all that is in the very ftrait of the ring is highly inflamed, and has fo adhered, that before the lower part mortifies, this part is firmly fixed in its place; and when the mortified part burfts out, the inflamed part keeps its place in the groin, adhering to the ring. It is thus that the preternatural anus is formed, and the furgeon, in fewing fuch an inteftine to the ring, takes ufelefs pains to fix what has already adhered; if there be a work of fupererogation in furgery, as I believe there are but too many, furely this of fewing an inteftine is one.

This it is which makes the chief difference, in point of danger, betwixt an ulcerated and a wounded inteftine; for, in a wound, there is, as we fhould fuppofe, no time for adhefion, nothing to keep the parts in contact, no caufe by which the adhefion might be produced: But, in an ulcer, there is a flow difeafe, tedious inflammation, adhefion firft, and abfcefs and burfting afterwards; fometimes a fiftula remains, dif-

charging fæces, and ſometimes there is a perfect cure. If a nut-ſhell, a large coin, a bone, or any dangerous thing be ſwallowed, it ſtops in the ſtomach, cauſing ſwelling, and dreadful pain; at laſt, a hard firm tumor appears, and then it ſuppurates, burſts, the bowel opens, the food is diſcharged at every meal, till the fiſtula gradually leſſens, and heals at laſt:—But where the ſtomach is cut with a broad wound of a ſabre, the blood from the wounded epiploic veſſels, or the food itſelf too often pours out into the abdomen, and the patient dies. In the ſame way, if the piece of bone, or the coin go down into the inteſtines, and ſtick in ſome narrower turn, cauſing an inflammation there, or if worms, neſtling in the bowels, hurt them, the inflammation of the hurt inteſtine unites it to the peritoneum, abſceſs forms and burſts, the worms, or coin, or piece of bone, are diſcharged, the fiſtula heals, and all is ſafe: But if the ſame piece of inteſtine were wounded with a ball, much more if with a clean cut of a ſabre, how could it fail to pour its fæces into the abdomen, or what could keep the wound of inteſtines oppoſite to the external wound, or cauſe them to adhere? Why, there is one cauſe but little noticed, perhaps, and yet of conſiderable effect, which, though it cannot always prevent the diſcharge of fæces into the abdomen, often does.

I am well perſuaded, that the inteſtines, move leſs, in reſpect to their appropriated point of the abdomen, than their croakings in flatus; or their motion in our experiments upon opening animals, ſhould lead us to

ſuppoſe *. We ſee the bowels looſe and floating, when we open a body! we ſee them hanging by the meſentery, and we call it a ligament for ſupporting the bowels! and, we ſee bowels turning over each other, in the cruel experiments which we make upon living creatures †. Theſe circumſtances make an impreſſion

* When I ſpeak of their motions, in our experiments upon animals, I mean to allow, for the ſake of argument, more than can eaſily be proved:—For, I muſt mention to you, after all that has been ſaid about periſtaltic, vermicular, and antiperiſtaltic motions, that you may cut open twenty live cats, and never have the luck to ſee the leaſt degree of motion in their inteſtines, nor any ſuch thing. Vid. Memoires de l' Academie des Sciences.

† It is only, after having given the creatures the moſt acrid poiſon, that we can ſee violent contortions of the bowels; we ſeldom ſee any thing like this in the natural condition of the bowels.—We ſee nothing like it, when the bowels of a human ſubject are among our hands, as in wounds or in herniæ.—We feel nothing like it, when, after rupture of the womb, we follow the child into the abdomen, with our hand, to extract it.—I have ſeen a child born, wanting all the integuments of the abdomen, the peritoneum only covering the bowels, and as tranſparent as a piece of the fineſt oiled paper;—and there I ſaw no motion, though I often looked with anxious attention, both while the child was aſleep, and when it was ſtruggling, being awake; and I have kept the preparation, to authenticate as much of the fact, as a preparation can explain.—I have looked, with the ſame degree of attention, to the bowels of a man, who, having thrown himſelf from a great height, had burſt the abdomen entirely, ſo that all the bowels hung out.—I have, indeed, not been guilty of cutting open the bellies of many cats or pigs, but I have a very poor opinion of the proofs which will ariſe from ſuch experiments, from all that I have hitherto ſeen.—That there is a motion in the inteſtines, it were very bold and ignorant to deny; but that there is that kind and degree of motion which has commonly been deſcribed, I am very far from believing.

which it is not eaſy to forget; and yet, when we talk of blood, or of fæces falling into the cavity of the abdomen, as if there were there ſome empty ſpace, ſuch as we ſee upon opening a dead body, I fear that we have a very poor notion of the abdomen, very unlike the truth.

There is not, truly, any cavity in the human body, but all the hollow bowels are filled with their contents,—all the cavities filled with their hollow bowels, and the whole is equally and fairly preſſed. Thus, in the abdomen, all the viſcera are moved by the diaphragm and the abdominal muſcles, upwards and downwards, with an equable continual preſſure, which has no interval; and one would be apt to add, the inteſtines have no repoſe, being kept thus in continual motion; but though the action of the diaphragm, and the re-action of the abdominal muſcles, is alternate, the preſſure is continual; the motion which it produces, is like that which the bowels have, when we move forwards in walking, having a motion with reſpect to ſpace, but none with regard to each other, or to the part of the belly, which covers them;—the whole maſs of the bowels is alternately preſſed, to uſe a coarſe illuſtration, as if betwixt two broad hands, which keep each turn of inteſtine in its right place, while the whole maſs is regularly moved:—When the bowels are forced down by the diaphragm, the abdominal muſcles recede; when the bowels are puſhed back again, it is the re-action of the abdominal muſcles, that forces them back and follows them; there is never an inſtant of interruption of this preſſure, never a moment

in which the bowels do not prefs againft the peritoneum; nor is there the fmalleft reafon to doubt, that the fame points in each are continually oppofed. We fee, that the inteftines do not move, or, at leaft, do not need to move, in performing their functions; for, in hernia, where large turns of inteftines are cut off by gangrene, the remaining part of the fame inteftine is clofely fixed to the groin, and yet the bowels are eafy, and their functions regular. We find the bowels regular, when they lie out of the belly in hernia, as when a certain turn of the inteftine lies in the fcrotum or thigh, or in a hernia of the navel; and where yet they are fo abfolutely fixed, that the piece of inteftine is marked by the ftraitnefs of the rings. We find a perfon, after a wound of the inteftine, having free ftools for many days; and what is it that prevents the fæces from efcaping, but merely this regular and univerfal preffure? We find a perfon, on the fourth or fifth day, with fæces coming from the wound! a proof, furely that the wound of the inteftine is ftill oppofite, or nearly oppofite to the external wound. We find the fame patient recovering without one ill fign! What better proof than this could we defire, that none of the fæces have exuded into the abdomen?

If, in a wound of the ftomach, the food could get eafily out by that wound, the ftomach would unload itfelf that way,—there would be no vomiting, the patient muft die; but fo regular and continual is this preffure, that the inftant a man is wounded in the ftomach he vomits, he continues vomiting for many days, while not one particle efcapes into the cavity of the

abdomen: The outward wound is commonly opposite to that of the ſtomach, and by that paſſage ſome part of the food comes out; but when any accident removes the inward wound of the ſtomach from the outward wound, the abdominal muſcles preſs upon the ſtomach, and follow it ſo cloſely, that if there be not a mere laceration extremely wide, this preſſure cloſes the hole, keeps the food in, enables the patient to vomit, and not a particle, even of jellies or ſoups, is ever loſt, or goes out into the cavity of the belly.

How, without this univerſal and continual preſſure, could the viſcera be ſupported? Could its ligaments, as we call them, ſupport the weight of the liver—or what could ſupport the weight of the ſtomach when filled? Could the meſentery or omentum ſupport the inteſtines—or, could its own ligaments, as we ſtill name them, ſupport the womb? How, without this uniform preſſure, could theſe viſcera fail to give way and burſt? How could the circulation of the abdomen go on? How could the liver or ſpleen, ſo turgid as they are with blood, fail to burſt? Or what poſſibly could ſupport the looſe veins and arteries of the abdomen, ſince many of them, *e. g.* the ſplenic vein, is two foot in length, is of the diameter of the thumb, and has no other than the common pellucid and delicate coats of the veins? How could the viſcera of the abdomen bear ſhocks and falls if not ſupported by the univerſal preſſure of ſurrounding parts? In ſhort, the accident of hernia being forced out by any blow upon the belly, or by any ſudden ſtrain, explains to us how perfectly full the abdomen is, and how ill it is able to bear any

preſſure, even from its own muſcles, without ſome point yielding, and ſome one of its bowels being thrown out. And the ſickneſs and faintneſs which immediately follow the drawing off of the waters of a dropſy, explain to us what are the conſequences of ſuch preſſure being, even for a moment, relaxed.

But, perhaps, one of the ſtrongeſt proofs is this, that the principle muſt be acknowledged, in order to explain what happens daily in wounds; for, though in theory we ſhould be inclined to make this diſtinction, that the hernia or abſceſs of the inteſtines will adhere and be ſafe, but that wounded inteſtines not having time to adhere, will become flaccid, as we ſee them do in diſſections, and ſo falling away from the external wound, will pour out their fæces into the abdomen, and prove fatal; though we ſhould ſettle this as a fair and good diſtinction in theory, we find that it will never anſwer in practice. Soldiers recover daily from the moſt deſperate wounds; and the moſt likely reaſons that we can aſſign for it are, the fullneſs of the abdomen, the univerſal, equable, and gentle preſſure; and the active diſpoſition of the peritoneum, ready to inflame with the ſlighteſt touch; the wounded inteſtine is, by the univerſal preſſure, kept cloſe to the external wound, and the peritoneum and the inteſtine are equally inclined to adhere; in a few hours that adheſion is begun which is to ſave the patient's life, and the lips of the wounded inteſtine are glued to the lips of the external wound. Thus is the ſide of the inteſtine united to the inner ſurface of the abdomen; and though the gut caſts out its fæces while the wound is

open, though it often caſts them out more freely while the firſt inflammation laſts; yet the fæces reſume their regular courſe whenever the wound is diſpoſed to cloſe; or if the fæces ſhould not reſume their natural courſe, we may force them onwards, by cloſing the wound with a plaſter, thus healing the fiſtula, which otherwiſe might never cloſe.

The two chief points of this doctrine are curiouſly proved by a caſe delivered by Mr. Littre, anno 1705, it is the caſe of a madman who ſtabbed himſelf with eighteen deep wounds, in the belly, and of theſe eighteen wounds, made with a long and ſharp pointed knife, eight penetrated into the cavity of the abdomen. The fever, pain, ſwelling, and difficult breathing, with vomiting and purging, proved them to be dangerous wounds; vomiting of blood, and clots of blood diſcharged by ſtool, proved that the wounds touched the ſtomach and inteſtines; yet deſperate as this caſe appeared, in two months the man was entirely reſtored. But here lies the important point; his madneſs came upon him again, and about eighteen months after, he threw himſelf from a high window, and died upon the ſpot: Upon opening his body, it was found, firſt, that the liver had been wounded, and had adhered in its middle lobe to the inner ſurface of the peritoneum; ſecondly, the jejunum had been wounded, juſt below the ſtomach, with a cut half an inch in length, acroſs the gut, and this inteſtine lying deep, was not preſſed againſt the internal ſurface of the belly, but was kept in cloſe contact with a contiguous turn of the ſame gut. The two turns of in-

testine adhered to each other; on the one intestine was the scar of the wound, while the other turn of intestine to which it had adhered was found. Thirdly, The right side of the colon had been wounded with a cut of an inch in length; the scar which it left was half an inch long; the adhesion here was to the inner surface of the peritoneum, by eighteen or twenty long thread-like tags of cellular membrane, or of peritoneum, issuing from the inner surface of one of the greatest scars in the belly.

Surely these things prove that the universal pressure within the abdomen is so uniform and constant, that not one only, but all the viscera of the abdomen may be deeply wounded, and yet no blood nor fæces be allowed to escape. They prove that this universal pressure keeps all the parts so in contact that they have the fairest opportunity of adhering. The particular manner in which the wounded turn of the duodenum had adhered to the opposite sound turn of the same gut, proves, that, towards which side soever a wounded intestine is pressed, it there finds the parts disposed by a sort of contagion, to inflame, and to adhere. And one thing appears to me very curious in this process of nature, that as soon as wounded parts adhere, then all the dangers of spreading inflammation cease; so that it is not by the stopping of the inflammation at the true point, that the wounded part adheres; but it is rather by the adhering of the wounded part that the inflammation is prevented from spreading wide over all the surfaces within the abdomen, just as the obliterating of an inflamed vein, by putting its

ſides together with a compreſs, ſtops the progreſs of the inflammation along that vein.

In ſhort, if any man had made experiments like theſe, upon animals, with the hopes of proving ſuch a doctrine as that which I have propoſed, he would have been very vain of his ſucceſs.

Our good old ſurgeon Wiſeman has ſaid with great ſimplicity, as a great many have ſaid after him, "Thus it frequently happeneth that a ſword paſſeth through the body without wounding any conſiderable part:" he means, that a rapier or ball often paſſes quite acroſs the belly, in at the navel, and out at the back, and that (without one bad ſign) the patient recovers, and (as has very often happened) walks abroad in good health, in eight days; which ſpeedy cure has been ſuppoſed to imply a ſimple wound, in which all the bowels have eſcaped: But we ſee now *how* this is to be explained; for we know, that in a thruſt acroſs the abdomen, ſix turns of inteſtine may be wounded,—each wound may adhere; adheſion, we know, is begun in a few hours, and is perfected in a few days; and when it is perfect, all danger of inflammation is over; and when the danger of inflammation is over, the patient may walk abroad; ſo that we may do juſt as old Wiſeman did in this caſe here alluded to*, "Bleed him, and adviſe him to keep his bed and be quiet." In ſhort, a man thus wounded, if

* Page 98. The caſe of a man who was wounded acroſs the belly, and well, and abroad in ſeven days.

he be kept low, has his chance of efcaping by an adhefion of the internal wounds.

Thus you fee I have made good that axiom which I laid down at the head of this difcuffion, too long perhaps, but which I could not avoid, viz. "That this tendency of the peritoneum to inflame, which is the chief caufe of danger, is alfo the only means of fafety." And having laid down the principles upon which you are to calculate the dangers of each wound, it will be eafy for you to underftand the diftinction of wounds; you will naturally apprehend, that this (like many other provifions of nature) too often fails; and that there will be danger of fæces getting out into the abdomen, juft in proportion to the broadnefs of the wound, or according to the bowel that is ftruck. If the ftomach be wounded, there is reafon to fear left that bag, which lies fo deep, and finks fo much under the weight of the liver, when emptied of its contents, fhould fall away from the outward wound. If a fmall inteftine be wounded, there is more reafon to hope, that the general preffure will keep it in clofe contact with the walls of the abdomen, fo as to give it an adhefion to the wound. If the great gut be wounded, near either of the groins, our chance is mended ftill more, for the caput coli, and its figmoid flexure, are fo fixed down to the loins, as to fecure us againft many accidents.—The wound of that gut will not forfake the wound of the abdomen; the fæces will furely efcape into the cavity of the belly; the inteftine will not be fo likely to double upon itfelf, and protrude, like a prolapfus ani,

an accident which the floating inteftines are peculiarly fubject to, when they have been engaged in herniæ, and have gangrened, fo as to have formed an anus at the groin. Laftly, By the clofe connection of the bottom, efpecially of the caput coli, with the thick and flefhy parts of the loins, it eafily heals. All this has been obferved a hundred times, when this great gut has been engaged in herniæ, or when worms, cherry ftones, bones, leaden bullets, or other dangerous things, have remained in it, fo as to caufe an abfcefs with difcharge of fæces in the groin, or when the wounds of fwords have penetrated into the gut.

But other conclufions may perhaps arife from the doctrine of univerfal preffure, which, once fettled and acknowledged, would prove fatal to one of the moft approved theories of the prefent day; for, if there be any one general doctrine in modern furgery univerfally received, and having a general influence on practice, it is this, that air being admitted into the cavities of fhut facs, caufes an inflammation, which runs round the whole membrane; diforders all the parts contained in it; and almoft always caufes death, whether it be by fuddenly hurting the vital parts, as when the inflammation is in the head, breaft, or belly; or, whether it be by hectic, and a flow fever in wounds of the lefs important parts, as of the burfæ, or joints. And yet if there be any one doctrine, which the common laws of philofophy feem to con-

tradict, it is this; for how air ſhould (according to the now vulgar phraſe) "get acceſs to the cavity of a ſhut ſac," it is not eaſy to conceive. Whatever has become a general opinion muſt command reſpect; and, therefore, while I propoſe ſome doubts on this ſubject, I hope that they will be conſidered as doubts merely, not as refutations; for doubts concerning a general opinion, will ariſe in a man's mind, long before a perfect refutation can be accompliſhed. It ſeems to me, that there are here chiefly two points to be ſettled, 1ſt, Whether air really can be admitted thus into the cavity of the abdomen? 2d, Whether, though air were freely admitted, it be capable of producing thoſe dreadful effects which are aſcribed to it.

If there be any truth in the doctrine which I am trying to eſtabliſh, there can be but very little reaſon in the common theory of air being admitted among the bowels. Suppoſe a wound of an inch in length:—ſuppoſe the bowels to have ſunk, in ſome ſtrange way, into the pelvis, for example, ſo as to have left a mere vacuum; what ſhould happen with the flexible parietes of the abdomen? Should they ſtand rigid, while the air ruſhed into the cavity to fill it? No ſurely. But, on the contrary, the walls of the abdomen would fall together, and the preſſure of the outward air, far from making the air ruſh in by the outward wound, would at once lay the belly flat, and cloſe the wound. But ſince the walls of the abdomen are not flaccid, nor the cavity empty, but the abdomen full, and the flat muſcles which cover it

acting ſtrongly, the effect muſt be much more particular; for, the moment that the belly is wounded, the action of the muſcles will force out part of the bowels; the continuance of that action is neceſſary to reſpiration; the reſpiration continues as regular after the wound as before; and the continual preſſure of the abdominal muſcles and the diaphragm againſt all the viſcera of the abdomen prevents the acceſs of air ſo effectually, that though you ſhould hold ſuch a wound open with your fingers, no air could paſs into the abdomen, further than to that piece of gut which you firſt touch with your finger, when you thruſt it into the abdomen: Nothing is abſolutely expoſed to the air, except that piece of inteſtine which is without the abdomen, or that which you ſee, when you expoſe a ſmall piece of the bowels, by holding aſide the lips of the wound. The preſſing forward of that piece, and the protruſion of a portion of the gut, proportioned always to the ſize of the wound; the preſſure from behind keeping that piece protruded, ſo that it is with difficulty that you can puſh it back with your finger; this inceſſant preſſure in all directions, is an abſolute ſecurity againſt the acceſs of air. The inteſtine comes out, not like water out of a bottle, the place of which muſt be ſupplied by air entering into the bottle, in proportion as the water comes out; but the gut is puſhed down by the action of the muſcular walls of the abdomen, and that action follows the inteſtine, and keeps it down, and prevents all acceſs to the air, whether the gut continue thus protruding, or whether it be reduced; for if it be re-

duced, the walls of the abdomen yield, allowing it to be thrust back, but admitting no air. Those who want to know the effect of air, diffused within the cavity of the abdomen, must make other experiments, than merely cutting open pigs bellies;—they must give us a fair case, without this unnecessary wound. —We will not allow them to say, when they cut open the belly of any creature with a long incision, that the inflammation arises from the air:—Much less shall we allow them to say, when they open the belly with a smaller incision, that, by that little incision, the air gets into the abdomen, or that all the bowels are exposed to the air. They must not cut open the bellies of their animals; they must merely puncture them, and then blow them up.

But this reasoning goes still further; for it proves, that air can have no access to the cavity of any abscess, which is contiguous with the abdomen; for the continual motion of the walls of the abdomen, with the continual motion and pressure of the bowels, will keep the walls of such abscess in continual contact with each other, except in so far as they are dilated and separated by matter formed within the abscess, or by foul air generated along with that matter. I am sure Mr. Abernethy will pardon my mentioning his book here, since I do it in no unfriendly way: He should have gone a point farther than he has ventured to do; he might have denied, upon the soundest principles, that the air ever has access to the cavity of a lumbar abscess; for the air cannot enter such an abscess while it lies, as it does, deep in the cavity of

the abdomen, under the weight of all the viſcera, and continually preſſed by the motion of its muſcles; nothing could fill a lumbar abſceſs with air, but actually inflating it from the orifice at the groin*."

This effect, alſo, I would number up along with all the other conſequences of the continual and univerſal preſſure within the cavity of the abdomen. It is this preſſure which gives a continual and gentle motion to the viſcera, continual ſupport to them in their ſeveral offices, and a protection to their looſe and turgid blood-veſſels, without which they would burſt. When the bowels are wounded, this preſſure throws out the fæces, and keeps up the inteſtines cloſe to the wound. When the veins or arteries are wounded, it prevents the blood ſpreading into the abdomen, confining it in particular ſacs, and forming clots cloſe round the wounded veſſels. It is this univerſal preſſure, alſo which, when the belly only is wounded, (and not the bowels), prevents the acceſs of air; ſo that air does not enter, even to fill up the room of the very piece of inteſtine which is forced through the wound. And this, perhaps, among others, is one cauſe why hydatids, which are generated by the burſting of the pregnant ones, do not fall downwards in the abdomen, from the upper parts where they are commonly lodg-

* Any perſon, at all acquainted with the economy of reſpiration, will have obſerved, that I have marked this in a particular manner; that though the preſſure and relaxation is indeed alternate, with regard to the lungs, it is continual and unremitting, with regard to the abdominal viſcera, and all the parts connected with the abdomen, which are as much preſſed during expiration, as during inſpiration.

ed, but are found more commonly on the liver, and ſticking about the higher regions of the abdomen; while there is but one inſtance, I believe, of a hydatid having gotten down into the pelvis, betwixt the rectum and bladder, ſo as to choke the bladder and cauſe a ſuppreſſion of urine which proved fatal.

Perhaps, this doctrine, about the admiſſion of air and its dangerous effects, has been allowed to paſs unqueſtioned, for its father's ſake, that having been hitherto granted on his authority which I ſhall be ſo adventurous as to deny, viz. "That air is a fluid ſo acrid and ſtimulating, that, being admitted into a ſhut ſac, nothing can equal its terrible effects."

That the vulgar ſhould believe the firſt ſuperficial impreſſion that ſtrikes them, of air hurting a wound or ſore, is by no means ſurpriſing; but it is not natural, that men, bred to philoſophy, ſhould allow ſo ſtrange an aſſertion as this, without ſome kind of proof: that the air which we breathe, and which we feel upon the ſurface ſo bland and delightful, ſhould have ſo oppoſite a relation to the internal parts, that it ſhould there be a ſtimulus more acrid and more dangerous than the urine or bile,—is not to be believed upon ſlight grounds. I do affirm, that it remains to be proved, that this fluid, which ſeems ſo bland and pleaſant to all our ſenſes, and to the outward ſurface is yet a horrible ſtimulus, when admitted, as a celebrated author grandly expreſſes it, "into the deep receſſes of our body *."—"This ſtimulant power of the

* *Vide* Monro's Burſæ Mucoſæ.

air is the reaſon," ſays he, "why I have always inculcated in my Lectures, but, moſt eſpecially, ſince that period (viz. the year 1771) †, the advantages which would attend the excluſion of the air from the deep receſſes of the body, in performing DIFFERENT operations, and in treating wounds ACCIDENTALLY INFLICTED." That all this is not impoſſible in nature, we muſt acknowledge; but the author, from whom I quote, will, I am ſure, forgive me for ſaying it is not proved; I am entitled to ſay, that it is not proved; and, from the following obſervations, I am even inclined to believe, that the doctrine is abſolutely falſe, and all the concluſions from it, dangerous and quite wrong.

The air, for inſtance, eſcapes from the lungs in a fractured rib, and firſt goes abroad into the thorax; then into the cellular ſubſtance; then the emphyſematous tumor appears; but often, without any ſcarifications, with very little care or aſſiſtance on our part, the air is abſorbed, the tumor diſappears, and without inflammation of the cheſt, or any particular danger, the man gets well:—Here, then, is the air within the cavity of a ſhut ſac, filling the thorax, and

† One man is known by one quality, or failing, another by another.—Heiſter is remarked for ſober ſyſtematic writing, after the right German faſhion; Petit for good ſenſe, and ſound and careful obſervation; and Garengeot for tales like that about the ſoldier's noſe. The author, from whom I have quoted the above paſſage, will be eaſily known by his attention to dates, about which he makes himſelf, and every body around him, quite miſerable, while the lookers on can hardly underſtand the meaning of it.

oppreffing the lungs, without any dangerous inflammation enfuing.

That the air may be pufhed under the cellular fubftance over all the body, without caufing inflammation, is very plain from the more defperate cafes of emphyfema, where the patients, after living eight or ten days, have died, not from inflammation, but from oppreffion merely, the body being fo crammed with air, that even the eye-balls have, upon diffection, been found as tenfe as blown bladders. We have alfo many ludicrous cafes of this kind, which prove this to our perfect fatisfaction. Soldiers, or failors, fometimes touch the fcrotum with a lancet, introduce a blow-pipe, and blow it up to an enormous fize, imitating herniæ, by which they hope to efcape from the fervice. The old ftory of a man, who was fo wicked as to make a hole in his child's head, and blow it up, that he might fhow the child in the ftreets of Paris for a monfter, is well authenticated; and I have little doubt, that a fellow, who knew how to do this, would blow it up every morning, and fqueeze it out when he put the child to bed at night. Some villanous butchers, having a grudge at a foldier, found him lying drunk under a hedge; they made a little hole in his neck, and blew him up till he was like a bladder; or, as Doctor Hunter defcribes the difeafe of emphyfema, "like a ftuffed fkin."

The common operation of hernia (if the being expofed to air were really the chief caufe of danger), is one which, in all honefty and good faith, we fhould give up altogether; for it confifts in opening the fac,

handling the inteſtines, dilating the ring, and returning the bowels into the abdomen. As ſoon as we open the ſac, we can prognoſticate the fate of our patient: if the inteſtine be inflamed, he is not ſafe;—if it be dark-coloured, or livid, he is in imminent danger;—if it be of a ſound and natural colour, he is, in ſome degree, ſafe;—and the patient living ſo often, after the inteſtines have been thus expoſed, is a ſure proof that they are but little hurt by this expoſure to the air.

Bland as air is, when applied to the ſurface, and harmleſs as it now appears to be, though blown with a continual motion into what I am well entitled to call, the "deep receſſes of the body." And yet one author is ſo extravagant as to tell us, that it is not the inciſion for lithotomy, no, nor the pulling out of the ſtone, nor all the cruelties of that horrid operation that kills the patient, but that a great ſhare of the danger ariſes from the action of the air *; as if air, bland as it is, could ſtimulate the urinary bladder, which is both accuſtomed to bear the acrimony of the urine, and to bear it with eaſe, inſomuch that it is ſtimulated rather by the quantity than by the quality of what it holds; the bladder too, which is ſo far from having any high

* "There likewiſe ſeems to be ſtrong reaſon for ſuppoſing, that the danger, not only in the high, but in the lateral operation of lithotomy, may be leſſened, by the ſurgeon uſing every means TO EXCLUDE the air from the wound and bladder, during theſe operations, and by ſtitching the integuments after the high operation." Monro's Burſæ Mucoſæ.

degree of ſenſibility, that we can inject our alkaline water into it with but little diſtreſs to the patient.

Though " it is, no doubt, the nature of an hypotheſis, when once a man has conceived it, that it aſſimilates every thing to itſelf as proper nouriſhment; and from the firſt moment of your begetting it, it generally grows the ſtronger, by every thing you ſee, hear, read, or underſtand ;" yet this natural facility of temper, which every ſpeculator, but moſt eſpecially every medical ſpeculator, ſhould be willing to acknowledge, is but a poor apology for carrying an unproved doctrine, like this, ſuch extravagant lengths ; and driving with it full career, into the midſt of ſurgical practice, reforming, or at leaſt changing, the manner of every great operation. The catalogue of operations which have undergone this reformation, is curiouſly drawn out by an author of very high character, after the following manner : " A, Openings into the knee joint. B, The trepan. C, Emphyſema and empyema. D, Openings into the pericardium. E, Wounds of the abdomen. F, Cæſarean ſection. G, Lithotomy. H, The operation for hernia of the groin or thigh."

Theſe are the operations which have been put upon the new eſtabliſhment ; and from ſome of theſe new operations I ſhall give ſhort extracts, chiefly, in order that it may be known, that however ill this ſlight refutation may be managed, the arguments and innovations, propoſed on the other ſide are puerile beyond all conception.

B. The improved operation of the trepan, is this, " That the ſurgeon ſhall deſiſt from ſawing, when the

innermoſt lamella becomes thin; and then ſhall break it up with the levator or forceps †. Here there are three points to be ſettled, before the improvement can be acknowledged or received; that the breaking up the bone, as we punch out an old tooth, will prevent air getting in, or will prevent harm to the dura mater; and alſo, that there are ſurgeons ſo ignorant, and ſo raſh in an operation, which requires no kind of haſte, as to drive their trepans through the dura mater, and of courſe into the brain; or it muſt be proved, that after cutting up the depreſſed piece of ſkull, the air will get into the brain, which we know well it cannot do; for the inſtant that the preſſure of the ſkull, which preſerved the balance, is taken off, the brain riſes; and if the dura mater be entire, this riſing makes the dura mater in every caſe that I have ſeen, as tenſe as a drum, and makes it bulge ſo through the trepan hole, that it is in danger of being cut upon the edges of it; if the dura mater be cut, then the brain itſelf protrudes. Or, laſtly, it muſt be proved, that air is the cauſe of the fatal inflammation; which it will

† "In the operation of the trepan, I have adviſed, that the cranium ſhould not be entirely cut with the ſaw; but that the operator ſhould deſiſt from ſawing, when the innermoſt lamella becomes ſo thin, that it can be eaſily broken off with a levator, or forceps, by which we not only avoid the danger of the inſtrument preſſing rudely on the brain, but alſo, in many caſes, the cutting of the dura mater, and admiſſion of the air to the ſurface of the brain, which experiments I made on HALF A DOZEN PIGS, near THIRTY YEARS AGO." Monro's Burſæ Mucoſæ.——N. B. Pigs have but one table in their ſkull, or no tables at all.

not be eaſy to accompliſh, nor very wiſe in any ſober man to attempt; for inflammation often comes on where there is no fracture, where no air is admitted, becauſe no operation is performed.

The true cauſes of inflammation are theſe: There is firſt the terrible blow; there is a cruſhing and fracture of the bones; there is that hurt of the dura mater, which is inſeparable from a fracture of the bones of the cranium; and there is a piece of the ſkull cut out with the trepan, which, when it is ſeparated from the dura mater, leaves that membrane bleeding at a thouſand ſmall points; all the little arteries, paſſing betwixt the dura mater and the ſkull, being torn. We muſt forget that there are any ſuch accidents as theſe in our operation, before we can aſcribe the inflammation to the admiſſion of air.

But even granting the value and high importance of this improvement, how little credit the author of it, as he calls himſelf, ſhould have, may be underſtood by the following tranſlation from Hippocrates: "Nor is the perforation to penetrate entirely into the cranium, leſt the dura mater ſhould receive ſome injury, either from the INSTRUMENT, or from a long expoſure to the AIR. To avoid this laſt inconvenience, by which it is often putrified and deſtroyed, the piece of bone within the tenebra ſhould be ſuffered to remain till it comes off of itſelf *."

C. "In the caſe of air infuſed into the cavity of the thorax, it is adviſed that the operation ſhould be per-

* Riollay's Hippocrates, p. 63.

formed with a ſmall trocar †; inſtead of which cautious method (ſays this author), Hewſon and others, following him, have propoſed an inciſion by a knife, which I have found even in experiments upon ſound animals, generally proves fatal from the degree of inflammation which the free admiſſion of the cold air creates." But let it be remembered, that the author keeps the canula ſtill in the thorax, and plugs it with a cork to preſerve an outlet for the air; —by which it is very plain, that he expects the lungs to fill the

† "In the caſe of air effuſſed into the cavity of the pleura, for which, SO FAR BACK AS M,DCC,LVIII, I ventured to propoſe the paracenteſis of the thorax, I have adviſed that the operation ſhould be performed with a ſmall trocar paſſed cautiouſly in a ſlanting direction; and, after withdrawing the ſtilette, and letting out the effuſed air, that a flexible canula, with a plug fitted to it, ſhould be introduced, in order to preſerve an outlet to the air till the wound of the lungs be cloſed; and that, before withdrawing the canula, any air remaining in the pleura ſhall be ſucked out with a ſyringe or elaſtic bottle. AND IN M,DCC,LXIX, a caſe occurred, in which, by my direction, that operation was performed nearly in this manner, with relief and ſucceſs. (See an account of this caſe communicated by Mr. Kellie, one of the ſurgeons preſent, to Dr. Duncan, and publiſhed by him in his Medical Commentaries, Vol. II. p. 427.)

"Inſtead of the cautious method above-mentioned, Mr. Hewſon (Med. Obſerv. London, M,DCC,LXVII. p. 396), and others following him, have propoſed an inciſion by a knife; which I have found, even in experiments on ſound animals, generally proves fatal, from the violent degree of inflammation which the free admiſſion of the cold air creates." In one experiment on a pig, the inflammation from the admiſſion of air by a ſmall inciſion, was ſo violent as to kill the animal, after producing an adheſion of the lungs with the upper part of the pleura, in the ſpace of thirty-ſix hours. See Monro's Burſæ Mucoſæ.

thorax with air, from time to time during the cure; ſo that if there come no inflammation in any ſuch caſe, it will not be from the want of air. He has told us alſo that ſmall inciſions or punctures are ſafe, though made with the intention of giving vent to confined air, and though kept open to let the air out from time to time; while large inciſions cauſe high inflammation:—I confeſs that theſe two concluſions ſeem perfectly natural, it is natural that if the inciſion were ſmall, the thorax ſhould be free of inflammation although full of air; and again it will naturally happen, that where the inciſions are large, the breaſt muſt inflame. In ſhort, it is plain, that inflammation, or the abſence of it, ariſes not from the preſence or abſence of the air, but from the length of the inciſion; there is no inflammation where the wound is ſmall, though it be made on account of confined air; there is inflammation where the inciſions are large, though they are made with the intention, and alſo with the effect of letting looſe the confined air. There is only one thing to be wondered at, viz. that this canula fixed ſo carefully in the thorax was not at leaſt as effectual in exciting inflammation as even the largeſt inciſion; how the pigs or men eſcaped inflammation I cannot conceive.

D. Points to caſes where the air burſting out from the alimentary canal inflamed the abdomen; and the caſes are three in number." "In the firſt caſe, the arch of the colon had been eroded by a tedious dyſentery. In the ſecond caſe, two holes were formed in the jejunum, by two pins, with their points turned

different ways, and tied together with a thread, which had been ACCIDENTALLY ſwallowed. In the third caſe, of a perſon in a typhus, the colon ſeemed to have burſt, during the operation of an emetic." This is the whole and full account of theſe caſes as delivered by the author. A tedious dyſentery, with an eroſion of the colon,—pins tied croſs-ways, and ſticking firm in the inteſtines,—and the arch of the colon burſt, and pouring out its contents, its foul air, fæces and all, into the cavity of the belly ; theſe are curious examples of air cauſing inflammation. And I muſt ſay, that the phyſician has known little of practice who has not ſeen patients die in dyſentery, without the gut being eroded, or who has not ſeen emetics in typhus do the buſineſs, without any burſting of the colon.

E. That inflammation is, after the operation of Cæſarean ſection, the moſt frequent cauſe of death, it is neither hard for us to acknowledge, nor at all difficult to explain. The very directions which the author gives, imply at once a tedioufneſs and a rudeneſs in the operation, which muſt cauſe inflammation of the belly, an accident which is but too apt to happen, even when the operation is performed in the moſt gentle manner. The directions which the author gives for the operation, are to cut, firſt through the ſkin, then through the muſcles, then through the arteries then to plunge the hand at once into the womb, to get out the child ; again to get out the placenta ; ſtill a third time to dilate the orifice of the womb ; and after theſe dreadful inciſions, and all this

tedious work, he tells us, very calmly, that the inflammation arifes from the air. Doctor Aitken put the finifhing hand to this joke, when, in his book, on the PRINCIPLES of SURGERY, he advifed that we fhould perform the Cæfarean fection under the cover of a warm bath, the woman lying under water to exclude the air. This, though it may feem to be a fcurvy piece of wit, was really propofed in fober ferious earneft.

The admiffion of atmofpheric air as a ftimulus, when compared with the great incifions of lithotomy, —of hernia,—of hydrocele,—of Cæfarean fection,—of the trepan, is no more than the drop of the bucket to the waters of the ocean. And it is juft as poor logic to fay, that after fuch defperate operations, thefe cavities are inflamed by the admiffion of air, as it would be to fay, when a man were run through the pericardium with a red hot poker, that the heart and pericardium were inflamed " by the admiffion of air." Yet that nothing might be awanting to the abfurdity of this doctrine, this alfo is put down among the proofs, in fober ferious earneft, according to the following quotation:

" The DANGER of the ADMISSION OF AIR to the CAVITY of the PERICARDIUM and SURFACE of the HEART, is PROVED by the following very fingular cafe which *occurred* to me about SIX YEARS AGO: Two men in liquor difputing about their fkill in fencing, the one challenged the other to a match with pokers heated at the points, that there might be no miftake about the hits, and his challenge was accepted. One of

them received a thruſt under the cartilage of the fourth rib of the right ſide, about a finger breadth from the edge of the ſternum, in a ſlanting direction inwards. He complained little till the third day after the accident, when ſymptoms of deep ſeated inflammation began to appear, and, notwithſtanding bleeding and other remedies, CONTINUED TO INCREASE. Theſe, on the tenth day THEREAFTER, when I was called to him, were ſucceeded by rigour and coldneſs of the extremities, with a ſmall, frequent, and intermitting pulſe; and two days THEREAFTER he died. On opening his body, a SLANTING paſſage was diſcovered on the outſide of the pleura, into the mediaſtinum and cavity of the pericardium, in which laſt, about five ounces of purulent matter were found. The internal part of the pericardium, and the whole ſurface of the heart were much inflamed; but there was no mark of injury done to the heart by the point of the poker; and it appeared to me EVIDENT, that the fatal ſymptoms had been *chiefly* produced by the AIR ENTERING the PERICARDIUM in the time of INSPIRATION *."

I believe, that in this caſe of a man wounded through the pericardium, with a poker "hiſſing hot," few people will be at any pains to ſeek for any ſuch out of the way explanation as that of air admitted through the pericardium; and eſpecially one muſt be much diverted with the notion of the air being drawn in at every reſpiration through a deep and ſlanting wound of the ſkin, muſcles, thorax, and pericardium.

* Monro's Burſæ Mucoſæ, page 41.

This misfortune of inflammation, running ſo quickly round all the ſurfaces of ſhut ſacs, wherever they happen to be wounded, proceeds altogether from another cauſe, ſimple and plain to the laſt degree. For, in the wound of any ſhut cavity where the parts do not adhere, the inflammation ſpreads and runs its courſe, by a law of the animal economy which we explain very ill, when we call adheſion the adheſive ſtage of inflammation, repreſenting, as the firſt ſtage of a moſt dangerous diſeaſe, that adheſion which is a natural and healthy action, the moſt natural in all the ſyſtem, and the fartheſt from diſeaſe. Thus, in a wound of the breaſt or belly, in a joint, or in any ſhut ſac, if the parts being nearly laid together, ſhould once adhere, then there is no ſwelling, no pain, no formation of matter, the parts are well and ſound in the very moment in which they adhere; thus it is ſometimes in narrow and ſlanting wounds. But if the wound be broad and open, or if the leaſt thing keep the lips apart from each other, or if they run into inflammation, then the lips part away from each other, matter forms, the wound inflames, and not the wound only, but alſo the wounded cavity inflames; ſo that if it be in a vital part the man dies. If there be a high inflammation excited in any cavity, be it the thorax and lungs, or be it the cavity of a vein, if the ſurfaces are kept away from each other, the inflammation may go on, and ſo prove fatal; but if the ſurfaces touch each other and adhere, the part is again ſound and entire.

DISCOURSE IV.

ON WOUNDS OF THE BELLY.

YET here, in deſcribing wounds of the inteſtines, I have delivered but half the ſubject, I have ſtill to explain to you wounds of the liver, or of the ſpleen, of the kidney; of the meſenteric veſſels, or of the great abdominal veins,—which are indeed eaſily explained; for the inward bleeding, in all theſe wounds, is the greateſt danger;—and the bleeding may either be immediately fatal from mere loſs of blood, or the blood, exuding in leſſer quantities, lies clotted in the abdomen, is as a foreign body there; and thus, the inflammation, which is cauſed by the fæces in wounds of the inteſtine, is produced by blood, in wounds of the liver or ſpleen.

This enunciation of theſe wounds reduces whatever remains to be ſaid, to the moſt perfect ſimplicity;—divides them into two claſſes, the wounds with immediate bleeding, and the wounds followed by ſlow inflammation; and leaves but one thing to interrupt the ſubject, viz. the condition of the extravaſated

blood, how it lies in the belly, and by what accident it caufes death.

If the liver or vena cava be fhot, then there is a dreadful bleeding, which will be immediately fatal; for, after a ball has pierced the liver the patient finks, as if the ball had abfolutely wounded the great vein itfelf: The patient feels little pain; he grows pale and cold; he fwoons, from the inward lofs of blood; the belly fills with blood, becomes tenfe and hard; the man languifhes in this coldnefs and fainting, for a day, and expires: Often, the blood begins to flow from the outward wound; and, whether you permit your patient to bleed thus outwardly, or clofe the wound, that he may die a more lingering death makes but a few hours of difference in a wound, which is fo furely mortal. A wound of the fpleen, liver, or vena cava, is as deadly as a wound of the heart, fo full are they of blood.

But the blood may iffue from the wound of fome lefs important part; perhaps, it flows from a wound of the mefentery, from the veffels of the ftomach, or from a wound of the kidney, or of the emulgent vein. The flow of blood, from fuch veffels as thefe, is flow, and fo far fafe, being moderated by that refiftance and univerfal preffure, which I have lately explained; the blood flows flowly; it is feldom fufpected or perceived; clots are formed about the bleeding veins; and the patient flumbers, without pain, or apprehenfion of pain, for many days. But the patient and furgeon are roufed from this ftate of eafe and fecurity, by ugly fymptoms; for, on the fifth or fixth day, the patient

becomes uneaſy, his belly ſwells; he begins to vomit; the dreadful pains come on, and the ſurgeon gives up all for loſt, without knowing any poſſible cauſe for theſe alarming ſymptoms. But if the ſurgeon be careful in examining the abdomen, and fix his attention where the patient complains of pain, he will find a tumor there, more diſtinct than could be expected from ſuch a cauſe.

The courſe of theſe ſymptoms is very eaſily explained. The patient ſlumbers in eaſe and ſafety for ſix days; till then, no tumor, no ſwelling, no pain, no one ſign of danger appears, becauſe the inward bleeding has reduced him to this low and ſlumbering ſtate, becauſe the blood runs into the abdomen warm and mild, and is not felt as a foreign body:—But the blood ſoon gathering into the form of craſſamentum and ſerum, the ſerum becomes acrid, the craſſamentum lies heavy among the bowels, like a hard cake,—the inflammation begins, and this tumor being felt on the fifth or ſixth day, the belly inflames on the eighth or ninth; on the tenth day the patient is in extreme danger:—There is the dreadful pain, the miſerere mei, on the eleventh or twelfth day, the patient, after all the ſigns of gangrene, expires.

Sometimes, the ſurgeon, notwithſtanding the confuſion and uncertainty of theſe ſigns, adventures to open the tumor, thruſt in his finger, and ſo diſcharge the blood; and, for his encouragement in this bold operation (where he has ſo much to anſwer for), there are caſes on record, where the ſurgeon has cut out two, three, or four pounds of black and coagulated blood,

and his patient (after an incifion too of feveral inches long) has furvived;—and a furgeon, moreover, cuts with fome degree of fecurity; for the univerfal preffure of all the bowels prevents the blood from going out wide into the cavity of the abdomen, and collects it into feparate clots and tumors of blood lying directly over the wounded veffels, and fupported by the turns of the inteftines and mefentery, which are immediately below; the blood is not permitted to fall down into the pelvis, but is collected into clots at the wounded part; there, of courfe, the incifions ought always to be made, by enlarging the wound itfelf.

I have hitherto dealt only in general principles, and have explained to you the two great dangers, the effufion of the fæces into the cavity of the belly, and the effufion of blood; the former a violent ftimulus, exciting fudden inflammation, the latter a flower ftimulus, exciting inflammation, after an interval of many days of eafe and quiet, often cutting off our patient, when we have no apprehenfion of danger. I fhall refrain from detailing and explaining fully all the other points, which, however it might wafte your patience, never could exhauft the fubject. I fhall rather try to fum up the whole bufinefs in aphorifms, reciting briefly the points which are already difcuffed, and adding, in fhort rules, the doctrines of fuch wounds as are not yet explained.

1ft, WOUNDS of the LIVER are mortal; for confidering the nature of this vifcus, how full it is of blood! the cor abdominale, as it has been called, how can there fail to be a profufe bleeding? indeed, the wound

of the liver is, like the wound of a great vein. No doubt, a ball fometimes paffes through the thick fubftance of the liver, without caufing immediate death; or, perhaps, the patient furvives, becaufe the great veffels are not wounded ; or becaufe the blood flows very flowly from them, and coagulates in the wound; perhaps, the bruifing of the fhot deadens the veffels ; or, perhaps, the fwelling of a penetrating wound, in a fubftance fo foft and fpongy as the liver is, clofes the fides of the wound, fo that the bleeding ftops. However this be, we are fure that patients have lived twenty days with wounds fairly acrofs the liver; and fometimes, after wounds, where the liver muft have been wounded more or lefs, the patient has recovered. Yet thefe are exceptions merely to this general rule: Wounds of the liver ftill are to be declared mortal; there is a great inward bleeding, the patient immediately finks and faints, languifhes in a flumbering ftate, infenfible almoft, and without pain, lies cold and death-like, for perhaps twenty-four hours, and then expires.

2d, Wounds of the SPLEEN, or VENA CAVA, are alike fatal with thofe of the LIVER, and the figns of internal bleeding, from any of thefe, are precifely the fame ; and when a man dies, from the paffing of a chariot-wheel over his body, or is killed in boxing, or after a great fall is taken up dead ; or when a man has been ftruck in the belly, and killed by a great ball, which has not wounded the fkin, in all thefe (which I confider as parallel cafes) the hurt is often found to be in the liver, vena cava, or fpleen, or kid-

ney, any of which being burſt, pour out ſo much blood, that the patient dies.

3d, BLEEDINGS from wounds of the MESENTERY,—KIDNEY,—EMULGENT VEIN, or any ſmaller veſſel, are often ſlow and gentle, and are not known by the common ſigns of inward bleeding. The patient continues eaſy, and his belly ſoft, for ſome days, till the blood coagulating, either by the weight of its coagulum, or by the acrimony of its ſerum, excites inflammation; ſo that, on the ſixth day, there comes pain, ſwelling, hardneſs of the abdomen, quick pulſe, fever; at laſt the torments of the miſerere mei, and then gangrene, and death:—And here it may be noticed, that if there be immediate fainting on receiving the wound, and then coldneſs, accompanied with a continued faintneſs, ſwelling of the belly, and oppreſſed breathing for ſome days, moſt likely, there is blood, extravaſated, and in dangerous quantity, from ſome greater veſſel:—But if the patient have lain eaſy, and there comes pain, ſwelling, fever, and other threatening ſigns, on the ſixth or ſeventh day, with a tumor in one part of the belly, it is moſt likely a bloody tumor, which has begun to excite inflammation, and the blood muſt be cut out. If there be pain and ſwelling on the firſt or ſecond day, it is from wounded inteſtine;—if there be pain and ſwelling, but not till the ſixth day, it is from blood;—if there be no pain nor ſwelling, till after the fifteenth day, our patient is almoſt ſafe.

4th, The ſigns of a wounded ſtomach are a burning ſenſation at the pit of the ſtomach,—heat, thirſt, and a

feverifh pulfe, great irritability of the ftomach, and vomiting fo intenfe, whenever the mildeft things are taken down, as to throw the whole frame almoft into convulfions. Thefe are the chief figns of a wounded ftomach, together with bloody ferum thrown up, and blood paffing by ftool; and in the end, extreme weaknefs, faintings, a low quick and fluttering pulfe, fwelling of the belly and hickup, and commonly death. Yet often during all this violence and ftraining continued for weeks, not one particle of food goes out into the belly; no doubt, it cannot always happen thus, but it often does.

5th, When the inteftines are wounded, the efcaping of the fæces declares but two well the nature of the wound; and too often there comes on an inflammation, not fo limited, as merely to make the inteftine adhere, but diffufing itfelf over all the belly, whence come knottings and adhefions of the inteftines, fwelling of the belly, fever, pain, the miferere mei, inward mortification, and death.

6th, Wounds of the bladder are always, or almoft always, mortal; for the bladder both difcharges its contents by its own contractile power, and lies very low in the pelvis: it throws out its urine into the cavity of the abdomen, which is a fluid fo highly ftimulating, that inflammation and mortification of the bowels are not long delayed.

7th, The wound of the gall-bladder is like this; for its fluid is ftimulating in a ftill higher degree, and the patient very feldom efcapes the quick and deadly inflammation; the urine or the bile act like poifons

thrown into the abdomen, the patient dying a moſt miſerable death.

Thus the prognoſtic of danger goes downwards, according to the ſucceſſion of parts; thoſe which are moſt important in the animal economy being affected in the higher wounds.

Wounds of the liver and ſpleen are deadly, from the inward bleeding, wounds of the ſtomach are hardly leſs mortal, for there is both a bleeding, from its numerous veſſels, and danger of its food being poured out into the abdomen; there is great danger of inflammation alſo from the mere wound. The wounds of inteſtines are leſs dangerous; for though the fæces are ſometimes poured out, ſo that the belly inflames, though the inflammation, which ſhould heal or unite the inteſtine, to the abdomen, often ſpreads over all the ſurfaces, yet they are ſafer than wounds of the ſtomach; for the inteſtines are quick in their inflammation, the peritoneum, by a wiſe proviſion of nature, is apt to inflame; there is, at ſuch a time, a ſort of ſympathy, like a contagion, among the contents of the belly, ſo that, towards whatever point this wounded inteſtine is turned, it meets with parts ready to inflame, and thus the wounds of the bowel and of the belly inoſculate, and the patient is ſaved.

The great inteſtines, lying lower in the abdomen, are leſs dangerous ſtill; they are bound down in their right place, they are behind the peritoneum, and they lie upon the thick fleſh of the lumbar muſcles, ſo that their wounds quickly heal. But ſtill it muſt not be forgotten, that, though neither the liver, ſpleen, ſto-

mach, nor bowels are wounded, inflammation may come on merely from the hurt done to the peritoneum itſelf; after a wound of the belly the patient can never be without danger.

There is but one thing more relating to the prognoſtic, in theſe wounds, which you ſhould endeavour to remember, viz. that the ſtomach, by its ſinking, is apt to ſpill its contents into the belly. The inteſtines are leſs apt to do ſo, for they are held ſteadier in the abdomen; the urinary bladder diſcharges into the abdomen, becauſe it is emptied by its own contractile power; the gall-bladder muſt ſpill its contents when wounded, for there is nothing that can hinder the bile from flowing. The bile is the higheſt ſtimulus, the urine next, and the food and the fæces are leſs irritating, and the blood leaſt of all; and, perhaps, it is according to this order, that the dangers of theſe wounds ſhould be calculated, effuſions of bile being the moſt dangerous *, wounds of the urinary bladder next to theſe, wounds of the ſtomach and bowels come next in order, and effuſions of blood are the leaſt dangerous as a cauſe of inflammation, if only the bleeding be not ſo profuſe as to endanger life.

Laſtly, If the ball remain in the belly, though the patient eſcape through the firſt dangers, he is never

* I ſaw a man die in a very miſerable condition, who had, by a fall, torn the gall ducts, ſo that the abdomen ſwelled with dreadful pain: the moſt thorough jaundice I ever ſaw; and the abdomen, when opened, was full of bile, ſerum, and coagulable lymph,—the inteſtines univerſally turgid of a yellow colour,—univerſally inflamed,—adhering at ſome points, and gangrened in others.

ſafe; for the ball being lodged about the loins, in the heart of the muſcles, cauſes carious bones, fiſtulous ulcers, and running of matter, with a hectic fever, (which cannot ſtop while the ball remains), ſo that this is a very hopeleſs caſe †.

Now, before I lay down the few ſhort rules which relate to the practice, it is my duty to remind you, that we can do but little in the cure, nature herſelf cannot do much, we are as ſpectators merely, and every recovery is truly an eſcape.

Surgeons have boldly cut into the ſtomach, and extracted knives which had fallen down into it; foreign bodies of all kinds have made their way ſafely through its walls; ſoldiers have often recovered, whoſe ſtomachs had been ſo wounded with the ſabre, that the rice, or barley, or meat, which they had taken at laſt meal, has been caſt out through the wound; and the older ſurgeons tell us, that in broad wounds of the ſtomach, they had ſewed the wound together with many ſtitches, ſewing the wound of the ſtomach to the external wound. There are not wanting caſes, where the wound of the ſtomach having been prudently managed by the modern ſurgeon, the general preſſure has kept the ſtomach up to the wound, and adheſion has completed the cure; ſometimes wounds of the

† In opening the body of a young gentleman, who had been wounded in a duel, who had ſurvived his wound a whole year, lingering in a very sickly condition, till at laſt he was cut off by a hectic fever; we found the ball (which had paſſed in at the groin) lodged under the pſoas muſcle, upon the inner ſurface of the haunch bone, and ſurrounded with many ſacs of pus.

liver have healed; and often the surgeon has cut out safely, very large collections of blood; the intestines have so often adhered, without the help of such stitches, that, as I have said, you find anuses at the groin, and miraculous recoveries in every book; and read of cures, till you forget that there are dangers.

1st, Bleeding from the arm is the great preservative against internal bleeding, and is the only means of preventing inflammation;—in every wound of the abdomen, you must bleed with a very liberal hand.

2d, Quietness, rest, and opiates, with fomentations to the inflamed belly, are next in importance to bleeding; and the belly must be kept open with gentle glysters, but never with laxative medicines, lest they should purge.

3d, The patient must very resolutely refrain from all food, for ten or twelve days; for diet would support the strength, encourage the inflammation, and disturb the wound by a flux of fæces, which might, perhaps be thrown out into the cavity of the abdomen itself. The patient must refrain from food, then, that the intestines may not be moved. He must be nourished with glysters; or if he takes any thing by the mouth, let it be some jelly or soup, which, though it were to go out into the abdomen, might be absorbed.

4th, If the wound be in the belly merely, and a sound intestine be forced out, you must put it back gently with the fingers, and stitch the outward wound.

5th, When there is a wounded intestine which you are warned of only by the passing out of the fæces, you must not pretend to search for it, nor put in your

finger, nor expect to ſew it to the wound; but you may truſt that the univerſal preſſure which prevents great effuſion of blood, and collects the blood into one place, that very preſſure which always cauſes the wounded bowel and no other to protrude, will make the two wounds, the outward wound, and the inward wound of the inteſtine oppoſe each other, point to point; and if all be kept thus quiet, though but for one day, ſo lively is the tendency to inflame, that that adheſion will be begun which is to ſave the patient's life*.

6th, If indeed you have a wounded inteſtine fairly in your hand, protruding and plainly wounded, it were madneſs to let it go back into the abdomen, where there cannot but be ſome danger of the fæces getting out. But do not ſew the bowel with a long ſuture, in hopes of cloſing the breach, nor follow the ſtrange and whimſical inventions of cylinders of paper or of iſinglaſs, which it is eaſier to uſe in experiments upon dogs, than to practice in real wounds. You muſt make but one ſingle ſtitch, and ſew the wounded inteſtine to the outward wound,—there the gut will adhere, throw out its fæces for ſome time, and then heal, the outward and the inward wound uniting in one knot or ſcar.

7th, If a ſound bowel have come through a narrow wound, and be inflamed and ſo turgid, that you can-

* In Mr. Hunter's book on gun-ſhot wounds, there is a caſe of a gentlemen, who, having been ſhot through the belly in a duel, died in thirty-ſix hours; and it was found upon diſſection, that, even in that very ſhort period of a day and a half, the adheſions had formed.

not puſh it back; you muſt not think of pricking it with a needle or an awl, as was the cuſtom of Parée, Dionis, and all the older ſurgeons; you muſt perform the operation for hernia by ſlipping in your finger to guide the knife, opening the wound a little wider, till the inteſtine is free, and then ſtitching the outward wound after the inteſtine is put back.

You muſt take all poſſible pains, both about the ſurgery of the wound, and in keeping down the actions of the ſyſtem; for you perceive that there are ſuch chances as make every caſe intereſting and none deſperate.

If my reader ſhould wiſh to know ſomething more than theſe general principles, or ſhould deſire (as we commonly expreſs it), to be more minutely informed, about particular wounds of certain parts contained within the cavity of the abdomen, &c. he may read Mr. Benjamin Bell's chapters upon Wounds of the Inteſtines, Wounds of the Stomach," &c. and he may read that chapter upon Wounds of the Uterus, which begins with theſe words, "THE UTERUS IS A STRONG MUSCULAR BAG PECULIAR TO THE FEMALE SEX, BEING SOLELY INTENDED FOR THE FOETUS."

APPENDIX TO DISCOURSE IV.

ON THE MANNER OF STITCHING AN INTESTINE.

I have endeavoured to reprefent the real condition of a wounded bowel, and the eafy cure of it, in that fimple form in which I have conceived it. I have advifed that one fingle ftitch only fhould be ftruck through the wounded bowel, and then drawn alfo through the wound. And I have ventured, moreover, to fay, that if there be in all furgery a work of fupererogation, it is this operation of fewing up a wounded gut. The mechanical and vulgar conceptions of thofe who believe that a wounded inteftine is clofed, not by inflammation and the adhefion of contiguous parts, appears to me offenfive to a degree which I fhall hardly venture to exprefs to you.. But it ftrikes deeper and wider than this; it is not offenfive only, it is dangerous: for while I take an intereft, and find only a pleafant labour in teaching the young furgeon what is right to do, and what is confiftent with the fimple ways of nature, and the economy of the living body, he is feduced by a formal account of moft curious and ingenious methods of fewing a gut, and is drawn afide

to follow after ſuch puerile conceits, thinking to do more than even nature can do in ſuch a caſe. He reads in the ſyſtem of a celebrated author, that "their opinion is ill founded who would rather truſt to nature for the cure of a ſmall opening in the gut, than to inſert a ligature, inſomuch (ſays the author) that I would not leave even the ſmalleſt opening that could admit either chyle or fæces to paſs without STITCHING it up."

Theſe things cannot be left unſettled, without danger; they cannot be explained, without explaining and refuting alſo, wherever it is required, the opinions of authors; and again, it is impoſſible to explain thoſe things, without allowing ſuch expreſſions to eſcape, as are often more dangerous to the man who uſes them, than to the man who ſuffers them; and which no generous mind can think of uſing without regret: yet, what ſhall we ſay of a man, who adventures to write on a learned profeſſion, while he is himſelf totally ignorant; who writes boldly through the whole circle of the human body; of wounds which he has never ſeen, and of viſcera which he has never handled; who ſupplies his want of knowledge by bold conjectures only; who tells us, "that when the ſpleen is laid bare by a wound, it is eaſily diſcovered, whether it is wounded or not; that a diviſion (i. e. a wound) of the duct of the pancreas will, by interrupting or impeding digeſtion, do much injury to the conſtitution; and as the liquor *will* be effuſed into the cavity of the abdomen, it may thus *be productive* of *collections*, the *removal* of which may require the ULTIMATE aſſiſtance of ſurgery: That wounds of the receptaculum chyli

will be diftinguifhed by the difcharge of a milky liquor, and that they can never become the OBJECTS of furgery; but by producing collections in the abdomen, which may require to be DISCHARGED: That the difcharge from the receptaculum chyli is altogether white like chyle, or mixed with a confiderable portion of it; and that the patient becomes daily weaker THAN he OUGHT TO DO from a wound of the fame fize in any other part, owing to the nutritive part of the food being carried off before any advantage is derived from it *?" Who tells us, concerning the mefentery, "That in its wounds the difcharge of *chyle* or blood into the cavity of the abdomen, is what we have moft to dread; and that whenever any portion of the mefentery is PROTRUDED, it fhould be examined with ACCURACY;—and whenever any of its veffels are found to be divided, they fhould be TIED with LIGATURES," &c.? As for "wounds of the liver, they are apt, we are told, to prove particularly hazardous, from their allowing the bile, which is very SOON RENDERED PUTRID, to be poured into the cavity of the abdomen." "And wounds

* "With a view, fays the author, to prevent the diameter of the canal from being diftended, which, at the fame time, will leffen the extent of the wound, the patient fhould be kept upon a very fpare and cooling diet.—Any food, which he takes, fhould be not at regular meals" &c. &c. Is not the accuracy and carefulnefs of obfervations, fuch as thefe, efpecially meritorious, fince they are all concerning things which the author has never feen,—never heard,—never read of,---cannot underftand? Since this fame receptaculum chyli is nothing, it is only a name which the older anatomifts ufed, before they knew the part rightly; and now they find, that there is no fuch thing as a receptaculum, or bag.

of the gall-bladder are more dangerous, only as they are MORE CERTAINLY *productive* of EXTRAVASATIONS of bile into the abdomen."

Thefe obfervations are unparalleled in all the books of furgery, from the invention of printing down to this prefent day. The author talks of the fpleen laid bare, as if it were fome fixed vifcus, or one which could be feen, while it abfolutely lies among the deepeft in the abdomen, and cannot be drawn out into view, even in the diffection of a dead body, without thrufting down the hand for it; he talks of the pancreas as if it could be hurt without a moft complicated and abfolutely fatal wound; of the thoracic duct, as if it could be injured without a wound of the aorta, heart, or fpinal marrow; and of the receptaculum chyli as if it were a part really exifting, while it is merely a name, ufed ignorantly by the older anatomifts, and forgotten now; and, he not only defcribes how the patient furvives fuch wounds, but how gradually he waftes, and what means the furgeon is to ufe for his recovery: he talks as if the pancreatic duct could fill the abdomen with its faliva, or as if the thoracic duct could fill it with chyle; as if the mefentery could really protrude by itfelf, or as if the liver, as well as the gall-bladder, gave out bile. Thefe things lying all now before me, all in one fingle chapter, have inclined me, moft uncharitably, to call it a curious fpecimen of the art and myftery of writing furgery (and anatomy to boot) by conjecture and mere guefs; thefe groffer faults have, at leaft, weaned me thoroughly from that kind of prepoffeffion, which fome people indulge in

favour of every thing that is in print; and this, in its turn, will enable me to ſpeak confidently about the remaining errors in this chapter, upon wounds of the viſcera; for once more I affirm, that it is impoſſible for the young ſurgeon to receive willingly, or to follow confidently, this ſimple method of ſewing an inteſtine, which I commend, while other methods appearing to him more curious, more ingenious, or more ſecure, are left unrefuted.

This author firſt directs us to learn what is, according to his ſyſtem, a thing very eſſentially neceſſary to be known, viz. which is the upper, and which is the lower end of the gut:—" For it is neceſſary, in reuniting the inteſtines, to know which is the upper end; but it requires ſome attention to make the diſtinction. The periſtaltic motion will be obſerved to be more remarkable in the upper DIVISION than in the under. But the moſt certain method, is, to obſerve at which of the ends the fæces or chyle are evacuated," &c. &c.

There are ſome little things wanting in this explanation; for the author ſhould have told us, in the firſt place, how much of each end of the inteſtine muſt be hanging out in this eaſy negligent faſhion, before we can compare the periſtaltic motion of the upper end with that of the lower; muſt we learn to know, at one glance of the eye, whether the periſtaltic motion be faſt or ſlow? and whether it be ſuch as belongs to the upper end of the inteſtine? how or in what animals, and by what kind of experiments, ſhall we learn this? has this author ever ſeen the periſtaltic motion thus regular? has he ever ſeen chyle, ſo that he could ſwear

to it, that it was chyle? can he pronounce, from which hand the fæces and flatus come in an accidental anus at the groin? Now, my reaſon for aſking theſe queſtions, is a very humble one, viz. that I never ſaw chyle in the inteſtines (in the delicate veſſels, the lacteals, indeed, it is eaſily ſeen). I have hardly ſeen this periſtaltic motion, even in animals, when opened on purpoſe, and poſitively never in the human body; and when I have chanced to ſee an anus at the groin, I never could diſtinguiſh, whether the fæces and froth, and flatus, which iſſued from it, came from the right hand or from the left; they came from the general opening.

However, it muſt be acknowledged, that this author really has good reaſon to be careful about this matter; for his operation, which proceeds upon it, is a very deſperate one: He adviſes the ſurgeon to ſeek out the upper end of the inteſtine, or the end that may be wanting, not only by putting in his fingers, but by cutting up the wound! "I am clear," ſays he, "however that this (viz. the putting one ſtitch into the end of a wounded inteſtine, ſo as to hold it in contact with the outward wound) will not prove ſatisfactory to the feelings of any practitioner, poſſeſſed of that degree of fortitude which our art requires, and who has that regard for the ſafety of his patient, which every ſurgeon ought to poſſeſs. And, although I have adviſed, in wounds of the inteſtines, when no part of them protrude, where we cannot, therefore, know whether the wound be large, or only a ſmall puncture, and where the injured part may be

ſo ſituated, that it could not be reached, without opening the GREATEST PART of the ABDOMEN, and turning out PERHAPS the whole alimentary canal, that we had better allow the patient to have the chance of recovering, without any attempt to make a diſcovery, and which he may do if the wound is ſmall, than to propoſe a meaſure, which, of itſelf, might be attended with more hazard than the injury for which it was meant to be a remedy; yet, when we are rendered certain of the gut being completely divided by one end of it hanging out of the wound, as this will give much cauſe to imagine, that the other is at no great diſtance, I think it ought, by all means, to be ſearched for, by enlarging the external wound, ſo as to admit of the fingers of the operator being freely inſerted. Even where the upper part of the gut is protruded, it is worth while to ſubmit to this inquiry, merely in order to have at leaſt ſome chance of avoiding the loathſome inconvenience of an artificial opening for the fæces: And, where the upper part of the gut has ſlipped in, the patient can have no chance for farther exiſtence, if it be not diſcovered. In ſuch a ſituation, therefore, we ſhould not heſitate as to the meaſures."—I will not, as I have formerly profeſſed, quarrel with this author about many trifling faults, which I rather chooſe that my reader ſhould have all the merit of diſcovering, without being beholden to me; but I cannot refrain from ſaying, that this is not the prudent way of addreſſing young men, who are but too apt to do adventurous things upon ſlight authority. But this is not all; other curious improvements follow

close upon the heels of this important discovery; for, as soon as the surgeon has found out the upper end of the gut, he is to thrust the upper end of the gut within the lower end, an inch or two, just as he would push in the sliding end of an opera-glass; and that the ends may go neatly within each other, a roll of isinglass or tallow is to be put into the gut; and that they may remain unmoved for some time, they are to be well and soundly sewed with a good needle and thread all round. Indeed, to read this, any sensible man must believe, that I spoke in mere ridicule, and described this firm sewing of the gut dishonestly; but I shall, as usual, give the quotation,—let the author speak for himself:—" In this situation, it would be difficult to draw the divided parts together with a needle and ligature, without hurting the opposite sides of the gut, in any other way than by keeping it extended by means of some round body inserted into it. For this purpose, it has been proposed to make use of a tube of thin pasteboard or paper; but as this might be laid hold of, and kept firm by the ligature, a small roll of tallow is preferable, as it will afterwards melt and pass easily off with the fæces. A piece of it, nearly equal to the diameter of the intestine, should be inserted into the end of the upper portion of the gut, and, being afterwards passed into the other, so as to carry the one to the extent of an inch, or thereby, fairly into the other, the two portions should now be STITCHED together with a small needle, armed with a fine thread. The stitches should be carried COMPLETELY ROUND the gut; and, in order to give them as great

a chance as poſſible of ſucceeding, they MIGHT EVEN GO TWICE ROUND! firſt, at the edge of the under portion of gut! and afterwards about an inch beneath, near to where the upper part of it terminates!"

From all which it is very plain, that the mechanical notions of this author are utterly incorrect; that he has no conception how a gut adheres, nor how that adheſion may be aſſiſted by a ſingle ſtitch, nor how impoſſible it muſt be for a gut to adhere, or to do any thing indeed but mortify, by being ſtitched all round, and ſtitched even with a double row. That a man, who has no conception of a gut being ſure in any other way than by the firmneſs of his own ſtitches, ſhould propoſe a double row of ſtitches, is not wonderful; he ſhould juſt have put a binding round it, and ſo finiſhed this admirable operation.

Now, I do affirm, that the carefulneſs, and apparent accuracy of all this, has irreſiſtible weight with a ſtudent, eſpecially when enforced and repeated in every different form; while, in fact, this way of diſtinguiſhing the upper from the lower end of a gut,—this thruſting of the fingers into the belly, this cutting up of the wound, in order to grope for that end of the gut which is wanting, this ſewing it upon a cuſhion of tallow, and the ſewing it faſt and firm with a double ſeam, is, like the reſt of the chapter, delivered upon conjecture merely; it is an untried experiment as yet, and let it be tried when it may, I ſhall venture to predict, that it will turn out a very ſad one *.

* This author adds one more ſpeculative direction, which is of the moſt ſingular nature, and has, as far as I know, all the merit that ori-

I ſhall now return, then, to repreſent once more the ſimple mechaniſm of this caſe. As for inteſtines cut fairly acroſs in all their circle, I believe the thing cannot happen, and that this, like the reſt, is a piece of mere gueſs work: for, if I know any thing about the way, in which the viſcera are diſpoſed within the belly, it muſt happen, that a ſabre which cuts one piece of inteſtine fairly acroſs, muſt have cut many other turns half through; and in ſhort, that a ſabre

ginalty can give it, that is, having ſewed the gut tightly, which he never fails to do, he adviſes, in the following paſſage, that the ligatures be cut off, and the gut with the ſeam in it, and the thread be thruſt back into the abdomen, and no more ſaid about it. "In this manner, ſays he, the ſides of the wound may be drawn cloſely and exactly together, without leſſening the diameter of the gut in any degree; and the end of the ligature may at laſt be ſecured, and cut off cloſe to the other extremity of the wound, if the gut is to be put freely into the abdomen, or it may be left of a ſufficient length to hang out at the wound in the teguments, if it is the meaning of the operator to retain the wounded part of the inteſtine in contact with the external opening. This indeed is uſually done, that we may have it in our power, as it is ſaid, to draw away the ligature, on the wound of the gut being cured. It is probable, however, whatever future may be employed, if more than one or two ſtitches have been paſſed, that it will be very difficult, and even uncertain, our getting the ligature away, without hurting the inteſtines, more than we ought to do. I would never adviſe, therefore, with any view of this kind, that the ligature ſhould be left out at the wound; leſs danger will ariſe from cutting it entirely away, and allowing the ſtitches to remain. A conſiderable part of it will fall into the cavity of the gut; and in ſuch circumſtances, the danger of the patient, from other cauſes, is ſo great that any additional riſk, that can occur from the remaining part of it, muſt be ſo trifling, as not to deſerve notice."

Benjamin Bell's Syſtem of Surgery.

cannot cut a piece of inteſtine acroſs, unleſs the ſtroke have cut up much of the belly, ſo much, that whether you finiſh with a double row of ſtitches, or whether you uſe or neglect the elegant invention of the roll of tallow is a matter of very little importance; but only that you had juſt as well ſpare yourſelf the trouble, and let the poor man alone.

The wound, ſlit-like in one ſide of inteſtine, is the thing which chiefly you have to do with. I have ſhown already, that ſuch a wound is to be cured, not by the edges of the wound adhering to each other, for they are like mere mathematical lines, having no breadth of ſurface and no broad contact; the lips of ſuch a wound are healed, not by adhering to each other alone, but by adhering at once to each other, and to the inner ſurface of the abdomen. I have proved by reaſoning, that the ſurrounding parts of the abdomen are at ſuch time highly ſenſible, much inclined to inflame, and ready to unite with them; and I have confirmed this, by ſhowing, that in one ſingular example, five deſperate wounds in one perſon healed: and there each wounded inteſtine adhered to ſome part of the peritoneum, or ſome other piece of gut in various ways. I have thus proved, that the mere preſſure upon the viſcera will keep the wounded gut ſo cloſe to the peritoneum, as to make it unite. But ſince it is plain, that the outward wound is the part of the abdominal ſurface, the beſt inclined to ſympathize and adhere with the wounded inteſtine, our duty plainly is, to make one ſimple ſtitch very ſlightly through the edges of the wounded inteſtine, not with the abſurd

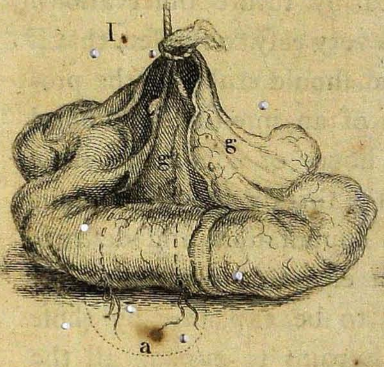
intention of fewing up the breach in the inteftine firmly with a needle and thread, but merely to keep the inward wound of the inteftine neatly and clofely in contact with the outward wound, when it will adhere,—will continue perhaps open, and throwing out its fæces for fome time, but will contract gradually as the outward wound contracts, and will clofe effectually and foundly before the outward wound heals.

But if it fhould happen that a gut is cut fairly acrofs in all its circle, which it is not impoffible, but it may be, by a ftab with a knife or broad fword, the mechanifm of the cafe is this: the mefentery ftill has its hold upon each end of the divided inteftine; and the two ends of the inteftine can never be far feparated from each other; nor can the one end be introduced fo far within the other as to make the double row of ftitches round and round, the one row diftant from the other an inch. It is not by this thorough ftitching that fuch a gut is to become found; it is only by adhefions, and by two adhefions taking place at the fame moment. The two ends of the gut may be made to adhere to each other; and the prudent way of favouring thefe adhefions is to introduce the one piece of inteftine a little way within the other, and make one fingle fmall ftitch in that part of the circle which is fartheft from the mefentery, and then draw the gut by means of that thread clofe up to the wound, and thus it will probably happen, that the mefentery will keep its fide of the circle firm, that the ftitch will keep the oppofite fide firm, that the gut being drawn by the thread, and pufhed from be-

hind, and flattened by the univerſal preſſure within the abdomen, the double adheſion may take place, viz. of the ſurfaces of the inteſtine to each other, and of the wound of the inteſtine to that part of the inner ſurface of the belly where it is open and inflamed by the outward wound.

Whether I have explained this ſimple proceſs rightly, will be beſt judged of by thoſe who are the beſt acquainted with the facts of ſurgery, as they now ſtand; and the method which is here propoſed muſt be authenticated or refuted by future obſervations. But, on the other hand, it is very eaſy to foreſee, that if this which I have deſcribed ſhould really be the proceſs of nature, the ſtitching of an inteſtine round and round cuts off at once all hopes of adheſion. How the inteſtine can diſcharge the threads of this complicated ſuture without total ſuppuration and deſtruction, or rather how it can eſcape a total and immediate gangrene, I leave to be explained by thoſe who have been at ſo much pains to explain all the reſt; for there remains but one thing for me to do, viz. to make ſure of my reader's having a correct idea of theſe two doctrines, by putting them down oppoſite to each other in the form of plans. Fig. 1ſt, explains the double ſuture; fig. 2d, explains the ſimple ſtitch; (a) points out the ſpace which muſt mortify, according to the DOUBLE SEAM METHOD; (b) ſhows the ſingle ſtitch by which we hold the two pieces of gut tight with regard to each other, and both cloſe up to the wound; (c) the dotted line, marks the direction in which the gut (e) lies within the gut (f); (g) ſhows

the mesentery ; (h) the way in which it keeps the two ends of the divided intestine right ; and it cannot be difficult to conceive how the stitch (b) will come easily away with little harm to the intestine, and not till after it has done its business effectually in uniting the inward to the outward wound ; so that though the breach which the stitch left were large, still the fæces would be discharged easily, and it would heal gradually along with the outward wound.



THE TANJORE MAHARAJA SERFOGI'S SARASWATI MAHAL.

DISCOURSE V.

ON WOUNDS OF THE HEAD.

"WHILE the bones in general ſerve as a baſis for the ſoft parts, and for ſupporting and directing the motions of the body; certain bones have a higher uſe in containing thoſe organs whoſe offices are the moſt eſſential to life. The ſkull defends the brain; the ribs and ſternum defend the heart and lungs; the ſpine contains that prolongation of the brain, which gives out nerves to all the body: and the injuries of each of theſe are important in proportion to the value of thoſe parts which they contain." In wounds of the head, it is not the deſtruction of the ſcalp merely that diſturbs us, nor the wound of the bone, though that of courſe makes a tedious diſeaſe; it is the injury of the brain alone that is dangerous; and the brain is hurt, ſometimes, by the general ſhock, by the oppreſſion of inward bleedings, or by depreſſion of the ſkull, and very often, ſo cloſe is the connection and ſympathy of all the external and internal parts, it is hurt by the very ſlighteſt injury of the ſcalp or bone. Thus it comes to be a very natural arrangement to explain to

you, firſt the indirect injuries of the brain, to explain how the hurts of the ſcalp or of the ſkull itſelf affect the brain indirectly; and, ſecondly, how, by concuſſion, or any other immediate injury, there is a direct affection of the brain.

OF SECONDARY AFFECTIONS OF THE BRAIN.

I ſhall firſt try to explain to you, in the way of a general doctrine, how careful you ſhould be of all kinds of wounds, and how watchful of the ſlighteſt bruiſes, how ſparing in your inciſions, and how reſerved in your operations of trepanning the ſkull, cutting the dura matter, or cutting away fractured bones; for there is an economy in theſe things, which, in the hands of a ſkilful man, often ſaves the patient; the want of which was a chief blemiſh in the practice of older ſurgeons.

It is as a general doctrine, (but not as a mere theory), that I would explain to you the intimate connection and ſympathy betwixt the integuments and ſkull, and through that with the brain. It is a doctrine which ſhould guide you not only in the ſlighteſt wounds, but in every ſtep of your boldeſt operation. You muſt not hold off the edges of the wounded ſcalp from each other, for they will inflame and ſuppurate with loſs of ſubſtance; you muſt not keep the wound open, leſt that ſhould hurt the bone; you muſt not trepan too much, leſt you hurt the dura mater; you muſt not open the dura mater on ſlight occaſions, leſt there come a protruſion of the brain; for the brain is expoſed, and the

balance and ſupport to it is loſt whenever you take away too much bone: The ſkin, the ſkull, the dura mater, are equally integuments of the brain; they ſhould be each more reſpected, as they are cloſer to the brain; and none of them ſhould be wantonly injured, becauſe they have all a cloſe relation to each other, and the moſt diſtant has its connection with the brain; and none of them ſhould be raſhly taken away, for it is a loſs which never can be repaired. By ſaving the ſcalp, you prevent exfoliation, and a plug is ſometimes formed to replace the part of the ſkull; but where neither the ſcalp nor the ſkull are ſpared, the inflammations of the membranes, the ſloughings from the dura mater, and the protruſions of the brain, are ſuch as to cauſe long ſuffering, and an imperfect cure in thoſe few who eſcape after this kind of ſurgery.

The range of this, as of every true doctrine, is of great extent, and the comparative view which it ſuggeſts of the ancient and modern ſurgery, as it relates to this point, is not uninſtructive.

No ſooner was a drunken fellow, who had been revelling in the ſtreets, carried with his head broken to any great hoſpital, than he was ſcalped; and, as Mr. Deaſe tells us ſeriouſly, they had him all ready by the morning viſit for any thing which might need to be done;—he was ſcalped in the evening,—his fractured bone was ſcraped and examined in the morning,—and in the courſe of twelve hours, without knowing who he was, or what he was, or how wounded, or almoſt whether he was ill or not! If there was

but a ſlight fracture on the head, he was trepanned: and if, during this ſhort proceſs he chanced to awake, he found himſelf ſtruggling among a ſet of good ſturdy aſſiſtants, who were leſs curious about underſtanding what he might have to ſay in his own defence, than in keeping him firm down upon the table, and occaſionally cramming his mouth with a handkerchief when they thought he roared too loud.

It is but a few years ago that theſe practices prevailed: the ſurgeon cut off every piece of ſcalp that was hurt, or cut even with a clean inciſion. If he performed the operation of the trepan, he thruſt in ſyndons into the hole, leſt it ſhould heal, for then it was their rule that the ſurgeon ſhould not incarn the wound till after forty or fifty days, in ſhort, till all the looſe pieces and the trepanned circle of bone ſhould have exfoliated and come away. By their cutting away the ſcalp, by their large trepannings, which they boaſted of as their greateſt work, by their ſcraping with trepan irons, to haſten the exfoliation, and by their anxiety about procuring a due concoction of matter, by their maſterly attempts at exfoliating the bone, which they performed chiefly with red hot irons, and the unavoidable delays of making new openings and cutting off the fungous excreſcences, they made a very tedious buſineſs even of the ſlighteſt caſe.

It is no wonder, that ſurgeons, who were thus afraid of cloſing the wound till the bone had exfoliated, were much averſe from ſewing the ſcalp; but you know, from what I have formerly explained to you in deſcribing ſabre wounds, how ſafe it is to lay down the

wounded ſcalp, how ſafe to ſettle it with ſtitches,—how eaſy to cut theſe ſtitches out if the ſcalp do not adhere, how ſoon all danger vaniſhes, and yet the danger is not ſlight, as you may eaſily be able to conceive from the compariſon of the old with modern practice. For the ſcalp being either held off from the ſkull, or being entirely cut away, left the bone naked; the exfoliation required ſix, eight, or ten months, more or leſs, according to the circumſtances of the caſe; and during all that time the patient was upon the brink of danger: The dura mater was always liable to fall into diſeaſe even during the firſt ſtage, i. e. during the exfoliation of the bone; when the bone exfoliated, the brain, or at leaſt the dura mater was laid bare, with a degree of danger exactly proportioned to the loſs of bone;—The leaſt accident was apt to hurt the part,—the leaſt irregularity inflamed the brain,—a conſtitutional diſeaſe, or even the bad health, proceeding from confinement, the air of an hoſpital, the ſlighteſt error in the dreſſing, was apt to corrupt the membranes, and produce fungi, and retard the healing of the ſore: many a change did ſuch a ſore ſuffer during the tedious cure, and every riſing of the pulſe, every ſlight headach, every change upon the wound, alarmed the ſurgeon; it is eaſy to conceive what numbers died, how difficultly and how imperfectly a few were cured, how critical the ſituation which a patient was often brought into by a wounded ſcalp.

A modern ſurgeon is very careful of the ſcalp, and knows, by much experience, that there ariſes, often from the ſlighteſt wound, the greateſt dangers. Though

the ſcalp be lacerated and thrown back, and even though the ſkull be cut up along with the ſcalp, he cleans it of blood, lays it down ſmoothly, and expects it to adhere. Though, in a narrow wound, he puts in his finger, and feels the cranium bare, though he puts in his probe, and knows that the ſkull is naked to a great extent, ſtill he lays down the ſcalp carefully, and preſſes it gently, that it may adhere. If, in a young man or boy, there be a clean cut, he is ſure that it will adhere; if the ſcalp be wounded by a fall, or by a brick, ſtone, poker, or any weapon which at once cuts and bruiſes, he is doubtful whether it will adhere; in a wound made with a club, or bludgeon, or in a gun-ſhot wound, he knows that there is a deſtruction of parts and loſs of ſubſtance, and he knows that there can be no immediate adheſion in ſuch a wound;—yet he does not entirely deſpair, but preſerves the ſcalp, hoping, in the end, and after ſuppuration is well eſtabliſhed, to put down the ſcalp, and keep the bone ſound.

There are, no doubt, diſappointments alſo in this ſafer practice, of putting down the ſcalp; but although the ſcalp do not adhere on the firſt or ſecond day, although the head inflame, and the ſcalp ſwell with eryſipelas, ſo as abſolutely to inflate the whole face, and cloſe the eyes, the ſurgeon is but little alarmed; he knows that this kind of ſwelling really belongs to the ſcalp, and betokens nothing wrong within; he very compoſedly cuts out his ſtitches, lets the ſwelling ſubſide, then lays the ſcalp down again, and thus after ſome accidents and interruptions, after ſwellings,

ſuppurations, ſlight fever, burſtings of the ſtitches, he, by a prudent perſeverance, makes good his point; reuniting in the end a ſound flap to a healthy bone. Thence it is plain, that there is no wound abſolutely ſafe; the ſlighteſt wound of the ſcalp may occaſion danger; but it is only when it does not adhere, that there is real danger; the moment that it adheres all is ſafe.

You will now underſtand, that by SECONDARY AFFECTIONS of the BRAIN, I mean all thoſe which ariſe not from any immediate oppreſſion, which do not appear at the time of the wound or blow, which make their ſlow inſidious progreſs in the form of diſeaſe; in which the ſcalp or perioſteum of the ſkull is firſt injured, which injury is followed, after a deceitful interval, with this ſecondary affection of the brain;—ſlow inflammation is the cauſe of all the miſchief, and we muſt not wonder at its ſlowneſs; for the ſkull is as a wall betwixt the external and internal parts, and it is only after corrupting the ſkull, that inflammation of the ſcalp can affect the brain; and if it be true of a clean cut, it is much more true, that after a blow with a club, or any heavy body, there often lurks under the ſlighteſt wound the moſt imminent danger.

A man who is knocked down with a club, becomes ſick, faint, revives very ſlowly, but at laſt recovers almoſt perfect health; he is able to go about, and feels as if in perfect health, or, if indiſpoſed, it is in ſo ſlight a way that he hardly knows what ails him, nor even apprehends the ſmalleſt danger;—but, after this interval of deceitful eaſe, laſting ſometimes for weeks

he again becomes, as at firſt, ſick and faint ; his knees bend under him, his hands tremble ; when he puts out his tongue, it trembles, as in a nervous fever ; there is a continual loathing of food, and he vomits at times. Then comes on an evening fever, a furred tongue, a quick and fretful pulſe, fluſhings of the face ; the eyes are red and turgid ; there is a corded feeling, with weight and pain of the head, wildneſs or timidity in the aſpect, and occaſional delirium during the night, which imports the greateſt danger. Now, there exiſts, in fact, a ſecondary inflammation of the brain ; ſometimes, there comes on a dreadful delirium, and the patient can hardly be kept in bed ; he ſtruggles with maniacal ſtrength, foams at the mouth, ſweats with the violent ſtruggling, till, being quite exhauſted, he ſinks into paralyſis or ſtupor, and then dies. But more frequently it happens, that, inſtead of this high and raging delirium, he is gradually more and more oppreſſed, ſo that, ſtill even in this laſt ſtage, it is a ſlow inſidious diſeaſe, and in place of this delirious ſtate, the ſickneſs increaſes with lowneſs and languor ; he has a low delirium, and is not eaſily rouſed ; if allowed to lie, he is ſunk in this ſtupor, if rouſed, he is ſlightly delirious, and raves ; while he is ſinking again, it is with a low and muttering delirium ; and, after continuing many days in this condition, he falls into paralyſis, is ſometimes convulſed, voids his fæces and urine inſenſibly, and dies.

The trepan is, in this caſe, almoſt a hopeleſs operation, and yet it is to be tried ; for theſe are the ſigns, though uncertain ones, of matter collecting upon the

brain. The shiverings and quicknefs of pulse are the signs of matter forming; the slight vomitings, delirium, and palsy, are the signs of its oppressing the brain: It is plainly an abscefs of the brain; and as it is an abscefs which cannot burst nor relieve itself, though the trepan may fail to relieve the patient, yet, without that help, he is infallibly dead. No man need be ashamed to have believed, that there was matter, or to have trepanned on account of it, when there was none; for what part is there in the body where the surgeon has not made his openings in search of matter, and has been deceived?—Or, why should we be ashamed, when we are deceived by symptoms so irregular, and so alarming too, as those of a disordered brain?

But of all the symptoms which mark this disorder of the brain, the nature of that tumor, which arises over the diseased part, is the most absolute and decisive sign: For when the scalp only is concerned, the inflammation and tumor are of the erysipelatous kind; when there is blood poured out from any artery of the scalp, it makes a soft and fluctuating tumor; but when there is a diseased skull, or dura mater, the tumor is small, soft, puffy, regularly circumscribed, and seated immediately above the diseased part of the skull;—and its proceeding from the skull explains to us, abundantly well, why it is small, circumscribed, and puffy; for we find, that this puffy tumor is the peculiar mark of a diseased bone; and its being circumscribed and circular, is a natural consequence of the tumor being limited to that part of the skull

which is hurt. Whether it be originally from a diſeaſe of the ſcalp, or from an internal affection of the dura mater, ſtill this puffy tumor is a mark of danger; and when we open ſuch a tumor, we find the pericranium thickened and raiſed; a thin ſanies is collected betwixt the dura mater and ſkull; the ſkull itſelf is rough and bare, inclined to yellow, or ſometimes of a dark colour, quite different from that of the ſurrounding parts, where the membrane is firm and ſound; ſometimes a ſmall fiſſure aſſures us more abſolutely of the danger within, yet, without this mark, we know, by much experience, that wherever the pericranium is thus inflamed and ſuppurated, the dura mater is ſeldom ſound.

This is the ſecond example of that ſympathy betwixt external and internal parts, which I have deſcribed with ſo much care, only becauſe it ſhould be much obſerved. This is the lurking danger which keeps a man ſo long, for many weeks, or even months, in a lingering and ſickly condition, and proves fatal in the end: This is the puffy tumor which Mr. Pott, and all modern ſurgeons, have ſo much noticed; this is the kind of danger, which makes Paræus declare, that there is no ſafety for the patient till a hundred days have expired *. It has been well marked, even from the time of Hippocrates, (who firſt noticed this

* Toutesfois tu noteras, que les anciens ont eſcrit, (ce qu'on void ſouvent par experience que les fractures du crane ne ſont hors du peril, juſque à cent jours apres la bleſſure; faite partout ſay avec ton patient bon guet, tant en ſon boire, manger, repos, coit, & autres choſes. Page 229.

kind of danger), down to this preſent day. It is through our apprehenſion of this kind of danger, that, while we do not deſpair in the moſt terrible wounds of the ſkull, we never diſregard even the moſt trivial wound. A bruiſed blow with a club, the wound of a ſtone, hitting the head againſt the door, even the ſlighteſt injury may bring on this moſt dreadful diſeaſe.

It is this, expreſsly, which makes gun-ſhot wounds of the head ſo much more dangerous than common wounds. Indeed, it is eaſy to conceive how the oblique touch of a ball, though it ſeems to graze but ſlightly, will cauſe this miſchief. We know, that the bruiſing of the inward parts againſt the ſkull is exactly equivalent to the bruiſing of the outward parts, hurting the pericranium;—and how the pericranium will corrupt the ſkull, and the ſkull the dura mater; and how in the end, after ſlow and very gradual ſymptoms, the dura mater will draw the brain into diſeaſe, it is very eaſy to conceive.

One ſoldier, for example, ſhall have his temple grazed with a ball, ſhall hardly know that he is hurt, or be ſenſible, for ſome time, that he is indiſpoſed;—ſhall walk about for ſix weeks, apparently in perfect health; and then, all at once, ſhall droop, and fall low, become ſick, and weak; ſhall, at laſt, fall into coma, or awaken into the moſt dreadful ſtruggling delirium, and then expire: And it ſhall be found, that the pericranium is ſeparated from the ſkull, the ſkull itſelf black, and the dura mater inflamed, and oppreſſed with pus: While, on the other hand, another

ſoldier in the ſame battle, ſhall be ſo wounded with a ſabre, that the ſcalp, ſkull, and all, ſhall be cut clean away with a wound even of the brain itſelf, and yet the patient eſcape; or, which is more ſingular, a ſoldier, wounded with a muſket-ball, which is left ſticking in the ſkull, with much depreſſion and many fractures of the bone, ſhall come to the hoſpital, walking alone; ſhall ſuffer the extraction of the ball, and all the inciſions and pickings of bone, which ſuch a caſe require; and ſhall eat and drink heartily, ſleep ſoundly, and ſuffer not one bad ſymptom during his tedious cure. All this looks as if confined matter, and a lurking diſeaſe were more dangerous than the worſt open fracture, and makes us watchful of ſuch ſymptoms; and, indeed, it often diſtinguiſhes the experienced ſurgeon, that he foreſees the greateſt danger, where, to the ignorant friends, there ſeems to be leaſt cauſe for alarm. The contraſt of two ſuch caſes, though ſeen but once in our lives (yet we have, but too often, occaſion to ſee them contraſted thus), would almoſt perſuade us to be of opinion with Le Dran and others, who ſeem to believe, that the more fracture there is, the better; that the yielding and fracture of the cranium ſaves the brain from concuſſion.

But it belongs to the preſent occaſion, to obſerve rather the inſidious and dangerous nature of this ſlow diſeaſe, than the wonderful recoveries after broad fractures of the ſkull. Wherever this puffy tumor ariſes, and the bad ſymptoms enſue, we are to uſe the trepan; and, ſometimes, before we have cut half

through the ſkull, foul matter begins to iſſue through the trepan hole; or ſometimes, matter being collected under the dura mater, makes that membrane very tenſe, and oppreſſes the brain, ſo that we find it neceſſary to open that membrane alſo. The patient is generally, for the time, relieved, but, often, he is again oppreſſed, and ſinks, and dies;—or, if he lives, great fungi, ſooner or later, ſhoot up through the opening; and, by theſe, as well as by blood or matter, he is, at laſt, oppreſſed, and dies commonly in convulſions. In ſhort, ſuch are the dangers of expoſing the brain, that I begin to incline to this opinion, that though it is abſolutely our duty to make one opening for the evacuation of matter; yet if that one be free, it is unneceſſary to multiply the openings; for the danger, on one hand, viz. by oppreſſion and inflammation of the brain, is juſt proportioned to the delay in opening the head; and, on the other hand, the danger after the operation is exactly proportioned to the number of holes.

Upon the whole of this matter, my notion is, that a man, who is not ſaving of the ſkull, is little better ſkilled in the principles of ſurgery than Godifredus, chief ſurgeon to the States of Holland, who boaſted of a friend of his, Henry Chadborn by name, alſo a ſurgeon in Holland, who had trepanned the head of Philip Count of Naſſau twenty-ſeven times; which Henry Chadborn had been ſo far from being inſenſible of this honour, that he got it ſettled by the following good certificate, under the prince's own hand: —*Ego, infraſcriptus, atteſtor me, ab* HENRIO CHADBORN,

CHIRURGO NEOMAGNESI, *poſtquam vigeſies ſepties mihi caput perforaſſet recte fuiſſe ſanatum.* DATUM WEICHEMI, 12mo, Auguſtii, annii 1664.—And as for the ſurgeon who does not ſpare the ſcalp, or rather, who does not labour to ſave it, as the main point of his practice, he is little better ſkilled in his profeſſion than the barber mentioned by Wiſeman, who ſeems to have had a moſt Indian-like faſhion, whenever he was called to a broken head (as barbers often were in thoſe days), of cutting off the ſcalp, and hanging it up, as a trophy, in his ſhop ; that thoſe who came only to be ſhaved, or bled, might know how great a ſurgeon he was *.

OF IMMEDIATE AFFECTIONS OF THE BRAIN.

Theſe affections of the brain, which I have juſt explained, are ſecondary ; only this delirium proceeding from high inflammation, or this oppreſſion and palſy proceeding from matter generated beneath the ſkull are indeed very frequent ; but yet the immediate injuries of the brain claim ſtill more of the ſurgeon's attention. In reſpect to theſe immediate injuries of the head, you cannot acquire a mature and ſteady judgment but by reading and reflection, and much experience ; if you obſerve theſe injuries only in detail, you will find the varieties infinite, and will ſee

* A young fellow, a ſervant to a horſe courſer, was thrown off his horſe againſt ſome of the bars in Smithfield, whereby the calvaria, or hairy ſcalp, was torn up from the coronal ſuture to the temporal muſcle on the left ſide : 'The ſkull was bared between two and three inches in breadth ; he was led to the next barber, who cut the piece off, and hanged it up in his ſhop.' Wiſeman, page 124.

nothing but inextricable confusion; if you learn to class and arrange the facts, you will find that the kinds of injury to the brain are really few and simple, that there is indeed one only, with which, as surgeons, you have any concern, or which your operations will relieve, that is COMPRESSION OF THE BRAIN.

To believe that a fractured skull is a chief cause, or even an absolute sign of danger, is a very mistaken and vulgar notion; it is not the damage done to the skull, but the injury to the brain, that is the cause of danger, and the fracture of the skull is but a faint uncertain mark of the harm done to the brain. The varied appearance, after injuries seemingly alike in all points, is very perplexing; but this we often have occasion to observe, that no particular injury, no harm to one point only of the brain, is fatal; that the fatal injury is always either that universal shock which we call CONCUSSION, or that general pressure which we call COMPRESSION of the BRAIN; except these two kinds of injuries, we know of none that is absolutely fatal; and perhaps we may with all safety, affirm, that there is, after all, but one kind of injury, strictly speaking, viz. CONCUSSION of the BRAIN that is fatal; for the brain itself may be wounded with weapons driven into its substance, may be cut and torn by fractured bones, may be wasted with great ulcers and tedious suppurations, or by collections of water the brain may be almost annihilated, without any remarkable affection either of the living principle, or of the rational powers. I have seen people survive prodigious effusions of blood for many days, their judgment being very little affected; and men lying under suppuration of

the brain for many weeks, and dying very eafily and flowly; I have very often feen the remains of moft unequivocal depreffions of the fkull (*e. g.*) from the kick of a horfe in boys who have grown up (the depreffion ftill continuing) till they became ftrong and healthy men. Since then no property of the living fyftem is hurt, none of the fenfes difturbed, none of the functions interrupted, fince the man not only lives under this load of injury, but abfolutely is reftored to perfect health and ftrength, after a lofs of the fubftance of the brain itfelf, we perceive clearly that no partial affection of the brain is fatal.

But CONCUSSION is an affection of the whole nervous fyftem, indefinite and infcrutable, which is often fatal: we cannot conceive its nature before death, we cannot find by diffection what is wrong, we cannot prevent its confequences. It is fome inconceivable derangement of the brain which fometimes follows a blow, even of the flighteft kind, or which is produced, as its name implies, by a fhock without a blow. A man falls from a great height, is not merely ftunned by the fall, but lies oppreffed, as if apoplectic, paffing his fæces involuntarily, his pupil is dilated, his pulfe flow and intermitting, his breathing laborious, fonorous, and alfo flow, his limbs cold, fometimes paralytic, fometimes convulfed, and thus he dies; no injury can be difcovered externally while he was alive, and when he is dead no injury can be found within; the brain is found, the membranes firm, no blood, nor matter, nor difplaced bone oppreffes the brain; he dies of a kind of injury concerning the nature of which we choofe to exprefs our ignorance, by calling it a CONCUS-

SION of the BRAIN. Since there is no visible derangement, we must continue, until we learn more concerning its nature, to consider it as some immediate disorganization or derangement of the whole brain, and we call it concussion, because it arises not from any particular injury, but from the general shock; it is more readily produced by falls, than by blows; it follows a fall upon the breech, as well as a fall upon the head; it has ensued after a fall, even upon so yielding a fluid as water; it proceeds from the general shock and derangement, but its particular nature is unknown; only this much we do know concerning its ultimate effect, that it produces a general weakness of the whole body, and the cold extremities, dilated pupil, laborious breathing, and intermitting pulse, are the signs of this weakness; and stimulants are well known to be the only cure. Bromefield began to use his sudorifics with advantage, without knowing what it meant, while it was really owing to the opium which they contained: wine was next used; blistering on the head was next used; and at last hartshorn itself was used with good effect. In short, that fact was discovered only by slow experience, which might have been understood from the most direct analogy, viz. that concussion is a state of weakness; for when a man is knocked down with the fist, for example, he groans, is oppressed, vomits, is deadly pale and cold, he is as in a faint; when he awakes, he staggers, has confusion of head, headach, and sickness of heart, and he is best recovered by hartshorn, or wine. Now, had this state continued, it would have proved fatal; had it been so, we should

have ſaid it was of concuſſion that he had died; the ſpecies is not changed by the degree of the affection: we know this concuſſion, whether temporary or permanent, whether ſlight or fatal, to be merely a ſtate of weakneſs; and we have fair warning to forſake the old plan of profuſe bleedings in all injuries of the head; we know that there can be no dangerous injury to the head, without ſome degree of concuſſion of the brain, and, therefore, in every oppreſſed patient we give opium and wine.

Comprrssion is like concuſſion, an affection of the whole brain, and in ſo far as we know it by ſymptoms, it is entirely the ſame; for a lethargic ſtupor, ſonorous breathing, oppreſſed and ſlow pulſe, and dilated pupil, are the chief ſigns of it. Compreſſion, moſt probably, produces a degree of that diſorder or derangement by which concuſſion is fatal; and one might ſay, without a violent figure, that compreſſion were like a continued blow; that had the blow been withdrawn the moment the man fell, he would have revived immediately; but by the bones being depreſſed, or blood being poured out under the ſkull, the blow is, as it were, continued; and, when after ſome days the bone is raiſed up, the man begins inſtantly to revive and move.

Then theſe ſeveral kinds of injury may be contraſted thus with each other: a partial injury to the brain, even although it deſtroy the ſubſtance of the brain, though there be, as I have often ſeen, a deep ſuppuration and waſting of the medullary ſubſtance of the brain, is not abſolutely fatal; the man lives

and is very little affected, and fometimes he recovers. Secondly, A general injury of the brain by fhock or concuffion is fatal; it is a kind of injury, the nature of which we can neither underftand before death, nor difcover by diffection, and which our operations cannot cure. Thirdly, A general injury by oppreffion or compreffion of the brain, is moft probably like, in its nature, to a general concuffion, differing from it only in degree, the one being a permanent incurable derangement, the other a temporary derangement of organization eafily removed. There is fometimes a CONCUSSION temporary and flight, as after a blow with the fift, which foon vanifhes; fometimes a more dangerous one, as by a fall from fome great height, which is permanent and fatal. And, in like manner, there is fometimes a flighter derangement from COMPRESSION which we can relieve by raifing the bone, or giving vent to matter or blood; and fometimes a permanent derangement, or perhaps, as fome will fay, a degree of concuffion along with the compreffion, which our operations cannot relieve. Thus it would appear that no partial injury is neceffarily fatal,—that concuffion, or this unknown internal derangement of the brain, is, if it goes a certain length, irremediable and abfolutely fatal,—that compreffion, which is like concuffion, is alfo often fatal; while fuppurations wafting even the fubftance of the brain hardly affect the vital or the mental powers, a patient living with an abfcefs deep in the very fubftance of the brain: and what is very curious, this internal fuppuration produces its worft effects, when the matter begins to be confined and

to oppreſs the whole brain, ſo that even in this caſe it is not ſo much the deſtruction of a part, as the oppreſſion of the whole, that is a cauſe of danger.

If there be an injury of the ſcalp, a hurt of the ſkull, an internal ſeparation of the dura mater, or any injury, which endangers inflammation of the brain, and if, along with that kind of danger, there be actually ſymptoms which mark inflammation of the brain, we try to prevent or moderate the inflammation by bleedings. If there be a concuſſion, and that the patient lies oppreſſed, vomiting, with difficult breathing and a ſlow pulſe, we uſe opium, wine, and all forms of ſtimulants. If there be, along with this oppreſſion, external marks of injury, after an accident, ſuch as might cauſe extravaſation of blood or depreſſion of the ſkull, in ſuch caſe our duty is, firſt, to open the ſcalp ſo as to examine the ſkull, and next, to trepan the ſkull, if it be not ſound, with the hopes of relieving the brain.

Thus you perceive, that no injury requires operation; except compreſſion of the brain, which may ariſe either from extravaſated blood, or from depreſſed bone, or matter generated within the ſkull.

* The vaſcular ſyſtem withint he the ſkull is ſo very

* The vaſcular ſyſtem within the ſkull, is what the ſurgeon is leſs curious about, for if it is burſt, or otherwiſe hurt, there is no helping of it; but the vaſcular ſyſtem without the ſkull, he is more intereſted in knowing well; and accordingly we have many directions about the way of managing the frontal and temporal arteries, but none, ſo far as I remember, ſo curious as that which I ſhall now quote. "In wounds of the forehead, hæmorrhages are troubleſome,

profuse, that extravasations are very frequent, both on the surface and in the cavities of the brain. Sometimes the veins of the choroid plexus burst, and then the ventricles are filled with blood, but this is less frequent after falls or blows than in diseases; sometimes the smaller sinuses or veins about the basis of the brain are torn, especially in counter-fissures, filling the skull

on account of the bleeding arteries running in a groove of the bone." This is an old foolish story, bandied about from hand to hand; it is in every book, old and new, so far the thing is excusable; but the following operation, as described in the next paragraph, is not to be passed over.

"When the hæmorrhage continues so profuse as to endanger the patient, it may be proper even to remove that portion of the skull in which the vessel is incased; or in the hands of a NICE OPERATOR, the intention may be answered by taking away only the outer table of the skull; for, in some cases, these arteries run for a considerable space between the two lamina of the bone, and in such instances our object must be accomplished by the removal of one of them." Vide Benjamin Bell's System of Surgery, vol. v. p. 169. I declare that I know nothing about the artery "running for a considerable space between the two lamina of the bone." Monro, I dare say, knows nothing about it; and this is at least one new operation, which Mr. Bell has a fair title to, and which I am sure he never stole from Dr. Monro. Has Mr. Bell ever seen a skull? or read of a skull? or heard of a skull? or can he point out any drawing of a skull, among all the books of the anatomists? with an artery sunk into the frontal bone? Until Mr. Bell satisfy me, in some way or other, about this artery, I shall hold this as one of the curious examples of the art of writing a system of surgery by conjectures and mere guess. And even when Mr. Bell has found out the skull that he wants, I shall still take the privilege of saying, that if any young man were, on his authority, to apply the trepan for such a reason, he would probably kill his patient.

down to the occipital hole, and ſometimes deſcending into the canal of the ſpine; ſometimes the blood burſts from the delicate veins of the pia mater, and then the ſurface of the brain is covered with blood; and very often the artery of the dura mater is burſt or torn, ſo as to oppreſs the brain with blood; when this happens, the caſe is ſtrictly an aneuriſm of the brain, and as in aneuriſms or burſtings of the internal mamary or intercoſtal arteries, the heart and lungs are oppreſſed; this aneuriſm of the artery of the dura mater oppreſſes the brain. This is the moſt frequent accident of all, becauſe the artery of the dura mater is moſt expoſed to be pricked or lacerated, in fractures of the ſkull; it is in a manner incaſed within the bone; but it is the leaſt dangerous, becauſe the moment we trepan the ſkull we give vent to the blood.

There is ſtill but one motive for applying the trepan, viz. to relieve the brain from compreſſion; whether that be from blood, matter, or depreſſed bone. If there be blood, it is to be known only by gueſs, by having opened the ſcalp at the place of the blow, in the expectation of finding a fracture of the ſkull; and by next trepanning the ſkull, in hopes of finding blood lying upon the ſurface of the brain. But if ſtill after opening the ſkull the patient ſhould lie comatoſe and oppreſſed, it being plain, that he muſt die if not relieved; and if alſo, from the tenſion of the dura mater, we ſuſpect that there is blood under that membrane, we muſt venture to open it alſo, in hopes of relieving the brain. If matter, lying upon the ſurface of the dura mater, be the cauſe of the compreſſion, it

will be known by the previous ſymptoms; by quickneſs of the pulſe, headach, fluſhed face, turgid eyes, corded feeling in the head, and all the other ſigns marking an inflammation of the brain. And if, after all theſe ſymptoms, ſhivering, languors, faintings, ſlight vomitings, and delirium come on, we are ſure of the caſe. If there be found a fiſſure of the ſkull, that fiſſure is not itſelf the cauſe of danger, but it is the mark of that degree of injury, which may have produced extravaſation; it alſo marks the place of the violence, and points out where we ſhould apply the trepan. A fiſſure is not of itſelf a motive for trepanning the ſkull; but if with the fiſſure the patient lies oppreſſed, then the oppreſſion is the mark of danger, perhaps, from extravaſated blood; and the fracture, or fiſſure of the ſkull, marks the point on which we ſhould apply our trepan. When the bones are directly preſſed down by the blow, our way of proceeding is very plain; if the bones be moveable, we raiſe them gently up, if they ſeem totally diſengaged, we pick them away, if the bones be locked in one with another, and preſſed under the ſound ſkull, we cut out one angle with the trepan, and that enables us to raiſe the depreſſed bone.

In all this operation we ſhould be gentle, and rather reſerved; for when blood has covered the whole ſkull from the ſagital ſuture quite to the petrous bone, it has all been evacuated by one ſingle opening, and the patient ſaved. When there has been pus generated in great quantity, and much of the dura mater detached, one ſingle perforation has been ſufficient.

When pieces of the ſkull have been apparently ſo detached from their membranes, that they have ſeemed irretrievably loſt, they have, notwithſtanding, lived and healed, eſpecially in young patients; and, often, when the depreſſion has ſeemed ſo great, that the ſurgeon has neglected to raiſe it, or has been ſo difficult to raiſe, that he has forſaken it, the patient has lived notwithſtanding the great oppreſſion, and been reſtored to perfect health.

Thus, once more I recommend to you to be gentle, and modeſt, at the ſame time that you are daring; and I venture to ſay, that no man, who knows of theſe things, will inſiſt upon raiſing, with unrelenting accuracy, and to the expreſs level of the ſkull, every depreſſed piece of bone, unleſs he were indeed a ſurgeon ſo very careful, "That in a wounded inteſtine, he would not leave even the ſmalleſt opening, that could admit either chyle or fæces to paſs, without ſtitching it up." But this is a kind of ſurgery which I have no good opinion of; you are not to uſe the trepan, unleſs when you have ſome direct and plain motive; there is enough of ſurgery, and of operations of all kinds, without ſuch imprudence; imprudence of this kind is quite unbecoming in a man who has grown old in ſurgery; but in one who pretends to teach the ſcience to others, it is dangerous in the extreme. Therefore, having laid down theſe few poſitive directions, I ſhall now mention one negative rule; and I ſhall explain it to you very roundly, viz. that you are not to hearken to thoſe writers, who are ſo hardened in ſurgery, or ſo childiſhly fond of opera-

tions, as to trepan the ſkull as willingly without any reaſon or apology, as when the motives are direct and clear. How much muſt a young man be ſurpriſed, at being told, firſt of all, that the operation of trepan is in itſelf, indeed, and independent of the accidents which have required it, a very dangerous one; but that, notwithſtanding this, it muſt be often performed, when we neither know what ails the patient, nor in what part of the head his diſtreſs lies: that when the patient lies ſtupid and oppreſſed, though we do not know whether it ariſes from compreſſion, or from the ſhock merely, or whether it ariſes from the depreſſion of the cranium, or from the effuſion of blood, we are ſtill to trepan;—how much muſt a young man be ſhocked with the cruelty and abſurdity of ſurgery, when he is told firſt, that when there is no tumor, nor any other outward mark of injury, he muſt examine round all the head, thumbing and ſqueezing it, and the moment that the patient ſeems to ſhrink, there to cut into the ſkull; next, that when he finds the outward ſurface of the ſkull ſound, he is to preſume, that the *inner table* of it is broken, and to apply the trepan; next, finding the inner table alſo entire, he is to cut through the dura mater, looking for blood, or ſomething under that membrane; and laſtly, having found his perforation at one point of the head ineffectual, he is to repeat his perforations all round, on various parts of the ſkull. This is the expreſs rule which a modern author gives to "young practitioners." And every want of motive, and every appearance of want of ſucceſs, is to puſh us deeper and deeper in

this desperate operation. What must a young man think of the science which he has set himself to learn? What must be the feelings of any old or sensible man of our profession, when he is told, that this single piece of surgery is diffused over fifty pages, is blazoned and enforced with the most violent assertions, and is exhibited as one of the most meritorious improvements in modern surgery. But lest my motives, for the wholesome criticisms which I am now going to make, should not be very manifest, I shall quote the text; and, having done so, I may then almost leave you to judge for yourselves. "But when no tumor, inflammation, or any other mark of injury, is discovered, we may, on some occasions, be directed to the seat of the accident, by pressing firmly over the whole head; and if we find, upon repeated trials, that pressure produces more pain in one particular part than in others, a circumstance of which we may be convinced, if the patient moans much upon pressure being applied to it; and if he puts up his hand, or draws away his head, on this trial being repeated, we may conclude, with much probability, that this is the seat of the injury *." "When, therefore, the symptoms of a compressed brain are evidently marked, we ought, without hesitation, to proceed to examine the state of the cranium, wherever appearances clearly point out, or even where they lead us only to conjecture where a fracture is."

"We do this by laying the bone bare, by making

* Vide Benjamin Bell's System of Surgery, vol. iii. page 39.

an incision with a scalpel through all the external coverings of the skull *." Upon the teguments being divided, if the skull is found to be fractured and depressed, the nature of the case is thus rendered clear and obvious; and the means which we shall afterwards point out, for the treatment of fractures, attended with depression, should be immediately employed. "But, even in cases where no outward appearance of a fracture is met with, and where no tumor, discolouration, or other external mark of injury is discovered, if the patient continues to labour under symptoms of a compressed brain; if the pericranium has been separated from the bone; and especially if this last has lost its natural appearance, and has acquired a pale, white, or dusky yellow hue, the trepan ought to be applied, without hesitation, at the place where these appearances mark the existence of some injury †."—"Again, although no mark, either of fracture or of any disease underneath, should appear on the external table of the bone newly laid bare, yet there is a possibility, that the internal table may be fractured and depressed. This, indeed, is not a common occurrence, but various instances of it are recorded by authors: I have met with it in different cases; and other practitioners, on whose accounts I can place the most perfect confidence, likewise mention it. ‡."

"In ordinary practice, if no benefit is reaped from the application of the trepan, if there is no fracture

* Ibid. vol. iii. page 40

† Ibid. vol. iii. page 44.

‡ Ibid. vol. iii. page 45.

diſcovered of the internal table of the ſkull, or no extravaſation on that part of the brain, newly denudated by a removal of a piece of bone, and if blood-letting, laxatives, and the other means uſually employed, do not remove the ſymptoms of compreſſion, it is generally concluded, that they depend, either upon a concuſſion of the brain, or upon extravaſation in ſome of the internal parts of it, where the effects of an operation cannot reach; and accordingly the patient is left to his fate, without any attempt being made for his relief *."

"In whatever part of the head the patient complains, on preſſure being applied to it, the ſkull ſhould be laid bare by an inciſion, in the manner we have mentioned. If both tables of the ſkull are fractured and depreſſed, the cauſe of all the miſchief will thus be diſcovered; but, even although no ſuch depreſſion or fracture ſhould be met with in the external lamella of the bone, as there is at leaſt ſome chance of miſchief being met with underneath, either from a fracture of the internal table, or from extravaſation; and as nothing can ſave the patient but a removal of this, the trepan ought to be immediately applied; and wherever there is the leaſt reaſon to ſuſpect, either from pain being induced from preſſure applied in the manner we have directed, or from any other circumſtance, that miſchief may be concealed: as long as relief has not been obtained by what was previouſly done, the operation ought ſtill to be re-

* Ibid. vol. iii. page 48.

peated, as being the only means from whence any advantage can be derived *."

"But it often happens, that no external mark is to be met with to lead to the ſeat of the injury; even after the whole head is ſhaved, and examined with moſt minute attention, the ſkin will, in various inſtances be found perfectly ſound, without any appearance either of tumor or diſcolouration. A patient, in ſuch circumſtances, we ſuppoſe to be in great hazard, from the brain being compreſſed in one part or another: Unleſs this compreſſion be removed by an operation, he muſt in all probability die; in what manner, then, is a practitioner to conduct himſelf? The ſituation is diſtreſſing; but ſtill, in my opinion, there ſhould be no heſitation as to the line of conduct a ſurgeon ought to purſue, which ſhould be quite the reverſe of what is almoſt UNIVERSALLY ADOPTED."

"It has hitherto been held as an eſtabliſhed maxim never to apply the trepan, in compreſſion of the brain from external violence, where no external mark occurs to point out the ſeat of the injury †;" "we ſhall ſuppoſe, therefore, for the reaſons now mentioned, that the trepan is to be applied on the account of ſymptoms which accompany a compreſſed ſtate of the brain; but where no external mark indicates the particular ſeat of the injury, it may be aſked in what manner is an operator to proceed? As the cauſe producing the compreſſion may exiſt as readily in one part of the

* Ibid. vol. iii. page 50.

† Ibid. vol. iii. page 117.

brain as in another, it may ſeem to be a matter of little importance in what part of the head the firſt perforation is made. This, however, is far from being the caſe; for, as we are ſuppoſing the compreſſion to be induced by blood or ſerum, and as theſe, while in a fluid ſtate, are always paſſing as much towards the baſis of the brain, as the connection between the dura mater and the internal ſurface of the ſkull will allow; it will be proper to form the firſt perforation in the MOST INFERIOR PART of the cranium in which it can with any propriety be made, and TO PROCEED TO PERFORATE EVERY ACCESSIBLE PART OF THE SKULL, till the cauſe of the compreſſion is DISCOVERED *." "But, as the ſafety of thoſe intruſted to us ought to be our firſt and great object, and profeſſional fame only a ſecondary conſideration, whenever we are certain that death muſt enſue, if not prevented by the timely application of a proper remedy, although there may be very little certainty of this remedy proving ſucceſsful; yet if it is the only means from whence there is any chance of ſafety, it ought undoubtedly to be employed. It is on this principle ſolely, that I have adviſed the practice of perforating the ſkull in different places, when, in caſes of compreſſed brain, the part chiefly affected is not pointed out by ſome external mark of injury †."

Any man may ſometimes be ſeduced, ſo far as to do incautious things in the heat and buſtle of an operation; but to write all this in cold blood is quite beyond the common. I might, indeed, very ſafely leave

* Ibid. vol. iii. page 121. † Ibid. vol. iii. page 130.

this to your own good ſenſe; but I muſt, in a few words, entreat you to conſider whither this practice would lead you. A boy is ſtruck by another with a ſtone, lies for many days bleeding at the noſe, comatoſe, vomiting, and with every bad ſymptom; his ſurgeons are all the while adviſing the operation, his friends are pleading for a reſpite, when the boy begins gradually to recover, and is in a few days perfectly reſtored. I have ſeen a prudent phyſician reſiſt with great perſeverance, while a bold ſurgeon, on the other hand, was violently bent on the operation, and the boy in a few days recover. I have known a gentleman after falling from his horſe, lie for many weeks oppreſſed, and in a profound coma, with continual vomitings, and bleedings from the ears ſo profuſe as abſolutely to endanger life, who yet recovered perfectly. Often, in the Hotel Dieu, where they dare not perform this operation, we hear of patients lying oppreſſed for many days, and weeks, and yet recovering in the end; and in every hoſpital we occaſionally ſee the ſame. Mr. Pott obſerves, "that ſymptoms of oppreſſion are no good reaſon for cutting the integuments, and that the loſs of ſenſe, the hæmorrhagy from the noſe and ears are ſometimes totally relieved by the common means *." Conſider if, in any given

* Mr. Bell of Albie having drunk too freely, was thrown from his horſe as he was riding home; he lay for ſome time on the ſnow, cold and benumbed,—no wound nor bruiſe could be diſcovered, only there was a ſmall ſwelling above the left eye, and that eye-lid was paralytic. His friends thought him in a ſound ſleep; but in a few hours he awoke in a violent frenzy, furiouſly mad, beating every one that

case, the patient lying oppressed, and having no mark of injury outwardly, upon the head, you should advise the trepan, while a man who had studied more the common sense of surgery than the authorities of school books, should prevent this unmeaning operation; and if, in the meanwhile the patient should be entirely relieved! what would become of you? Or, if you should be allowed to perform your operation, and should find nothing wrong, what consolation would that be? But if without any kind of motive you should continue your perforations quite round the skull, I dare assure you, that there is but one man alive who would stand forth to vindicate your conduct, and whether, after the experiment were made, he would have the boldness to do that, which, in all conscience and honesty, he ought to do, I do not know. This must be, no doubt, a precious lesson for young surgeons; the danger and folly of the thing is what must chiefly affect every serious person; but besides that, the following quotations must be very amusing to those who know how this matter really stands. "Although (says Mr. Bell) the opinion I have thus

came near him, and biting those that held him, so that it required four men to keep him down in bed, and many more to hold him while the surgeon bled him. Mr. Hill, after relating the case, and how he recovered his senses suddenly, while walking in the fields on the twentieth day, adds this note, "Dr. Gilchrist and I went often to him with the design of applying the trepan; but as no particular symptom indicated where that could be done with advantage, we did not think proper to do it by guess." Hill, p. 125. In this I am not sure but that they were pretty much in the right.

ventured to give is not agreeable to general practice, yet as this practice has ancient custom only for its support, being, in every other respect apparently ill founded, the advantages which may accrue from a different mode of treatment will only require to be thus fully pointed out, in order to procure it a favourable reception." "Prejudice arising from, and supported by ancient authority, will here, as in most cases, have some effect in preventing a *new* proposal from meeting with much attention; but I think it probable that no great length of time will be required to place it in a more favourable point of view *." It is a pity to see the author in such anxiety about this new proposal of his; it seems to have quite bewildered his judgment, whenever he tried to guess about the fate of this important discovery; in one moment he says, "it needs but to be thus *fully* pointed out to procure it favourable reception;" he says with the same breath, "prejudice will prevent it." If this maxim of operating with the trepan, only when some good motive for so doing can be shown, is now to be considered merely as an ancient custom, I must declare that it is an ancient custom with which I am well contented. If nothing but prejudice can account for a man refusing to trepan when he does not see any reason for so doing, I must rejoice that I am as full of prejudice as I could desire to be; but, after all, though he abuses us in this manner, about our general practice, Mr. Bell has really no great share in

* P. 131.

this curious difcovery; for I believe it would be eafy to convict fome very old and refpectable writers, and Heifter among others, of the wicked and felonious intention of anticipating this *new propofal* of Mr. Bell's. Heifter's words are thefe: "Sometimes it is impoffible to difcover the particular part of the cranium which is injured; the patient, in the mean time, being afflicted with the moft urgent and dangerous fymptoms. In thefe cafes it will be neceffary to trepan firft on the RIGHT fide of the head, then on the LEFT fide, afterwards upon the FOREHEAD, and laftly, upon the OCCIPUT, and fo ALL ROUND until you meet with the feat of the diforder*." Here, for the honour of the old furgery, is one man as free from prejudice as could be defired, and from all other feelings that might trouble a furgeon. If I were to take any further pains to refute an opinion againft which your fenfibility, judgment, and every manly feeling muft be roufed, I fhould employ myfelf chiefly in explaining to you how abfurd the intention were, and how melancholy the conclufion would be. As for the intention, it feems to me to be nothing more natural than merely this, that the furgeon is by all this boring at the fkull "feeking," as a certain great author would have expreffed himfelf, "fomething which lies fomewhere †." And as

* Heifter, p. 358.

† The author I allude to is Mr. John Hunter, who, in a moft curious account of a gentleman who had been fhot in a duel, with a ball which paffed acrofs the abdomen, informs us moft minutely, that, "among other fymptoms, he had frequent vomiting, chiefly of bile, with fmall bits of *fomething* that was of fome confiftence." Hunter, p. 546.

for the probable confequences, I am fure they are fuch, that we might with all fafety clafs the operation under that divifion of wounds which is denominated by old authors lethalitas per accidens. For "Wounds, (fays Heifter*) become MORTAL by ACCIDENTS, either by the ill conduct of the patient himfelf, or by the ignorance or neglect of the furgeon." "The accufed perfon ought to be acquitted, and the furgeon indicted."

* Heifter, p. 31. and 32.

THE TANJORE MAHARAJA SERFOGI'S SARASWATI MAHAL.

DISCOURSE VI.

ON WOUNDS OF THE THROAT.

IT is only by his general knowledge of the principles of ſurgery, and by his particular acquaintance with the parts about the throat, that a man can be prepared for the ugly accidents which overtake us ſo ſuddenly; but yet, however neceſſary this kind of knowledge is, I muſt preſume, that it is rather what you have already acquired, than what I ought to teach you. I ſhall refrain from any other than the ſlighteſt remarks upon the relations of the ſeveral parts of the throat to each other, and ſhall ſtate ſuch, merely, as will aſſiſt you in acquiring correct notions of the accidents which commonly happen, and, what is of fully as much conſequence, of the miſtakes that are very commonly committed; for I ſhall undertake to prove, that many among thoſe who have written caſes of this kind, have ſpoken very looſely, hardly underſtanding the parts which they pretended to deſcribe.

The LARYNX is the cartilaginous part of that tube which conveys the air;—and the connections of the

larynx with the furrounding parts are thefe: The OS HYOIDES lies under the chin, in that great fold which we call, in fat people, the double chin. It lies, properly, in the root of the tongue; whence it is fometimes called the bone of the tongue; it cannot eafily be felt from without; but, when we thruft the finger down into the throat, in the accident of a fifh bone, or any foreign body fticking there, we feel the two flender horns of the os hyoides extending and holding open the pharynx or bag, by which we fwallow;—fo that the os hyoides, which refembles the thought-bone of a fowl, has its bafe or angle lodged in the root of the tongue, and its two long horns extending along the fides of the pharynx.

The firft piece of the larynx is the THYROID CARTILAGE, the great fhield-like cartilage which protects all the others, which is eafily felt, being the moft prominent point of the throat. The outward projection of it, where it makes its angle in the fore part of the throat, is called the POMUM ADAMI; and within this cartilage, and under the protection of its broad wings, lies the RIMA GLOTTIDIS, or that delicate opening or chink, which forms the voice.

The EPIGLOTTIS, or valve, which lies over the glottis or chink, to defend it, is connected rather with the os hyoides, and root of the tongue, than with the larynx or cartilaginous part of the trachea.

Below this great thyroid cartilage, there is a circular or ring-like cartilage, joining the trachea or membranous part of the tube to the larynx or cartilaginous part; and then the rings of the trachea, five or fix in

number, complete the tube, to the place at which the trachea goes down into the cheſt. It is upon the very point where the trachea is joined to the larynx that the THYROID GLAND lies.

Behind the trachea, which is rigid, lies the OESOPHAGUS, which is quite a flexible tube; ſo that the LARYNX is the rigid part of that tube which is for receiving air, and the trachea is the continuation of the ſame tube; while the PHARYNX is the large bag, being the beginning of that tube which is for receiving food, and the œſophagus is the continuation of the ſame tube. The larynx, then, is ſo formed as to modulate the voice; the pharynx is ſo large a bag, as to be capable of receiving the largeſt morſel. The larynx can ſhut itſelf ſo accurately, as to prevent the ſmalleſt drop of fluid from entering into the trachea. The pharynx can dilate ſo freely, and can graſp ſo cloſely, as to receive the largeſt morſel eaſily, or ſwallow the ſmalleſt pill, or a drop of water.

Now, the chief point to be remembered, in regard to Wounds of the Throat, is the relation of the carotid arteries to the trachea and larynx; the connection of the great veins and nerves, again, with the carotid artery, and the manner in which the firſt branch of the carotid artery goes off.—Firſt, It is to be remembered, that the arch of the aorta lies in the upper part of the cheſt before the trachea; and that, where the carotid arteries come out from the cheſt, to go up along the neck, they are ſcarcely at the ſides of the trachea, they rather run before it: But that, as the arteries mount up the neck, they incline more to the ſide of

the trachea; and that, at the upper end of the neck, the carotids are entirely behind the trachea; for they incline towards the angle of the lower jaw, and, having reached it, they begin there to give off their branches, both thofe for the head and thofe for the neck. From this obfervation one thing very particular is explained,—how a wound at the lower part of the neck will very often be fatal, while a wound in the upper part of it is lefs dangerous. The fuicide feldom ftrikes at the lower part of the neck; and it is by this accident of ftriking very high and near to the chin that the carotids efcape.

Next it is to be remembered, that the carotid artery, the great jugular vein, and the Par vagum, or eighth pair of nerves, lie connected with each other, very clofely, being all enclofed in one mafs of cellular fubftance, forming fomething like a fheath. Now, fince this eighth pair is one of the greateft nerves of the vifcera; and fince, by experiments upon animals, we know well, that a wound of it is more fatal than a wound of the brain itfelf, this puts an end, at once, to all queftions about the way of managing wounds of the carotid artery, or of the great vein. No doubt, thefe may, fometimes, be partially wounded, and the nerve efcape; but, in general, the nerve will be cut along with them, and, at all events, the fear of including it will prevent our ftriking with a needle in the neck;—we can only take up the carotid artery, when we fee it bleeding with open mouth, and can pull it out with our finger and thumb; and how near it is to an impoffibility, that this fhould happen, and the pa-

tient live till the ſurgeon arrive, you may eaſily conceive.

This plain deſcription of the connections of the trachea, œſophagus, carotid artery, vein, and nerves, explains to you how ignorantly thoſe authors have written about Wounds of the Throat, who tell us, firſt, a formal ſtory about the wound having paſſed through both the trachea and œſophagus, and then, how the patient was cured;—for it is impoſſible to cut acroſs both trachea and œſophagus without wounding the carotid artery, the jugular vein, and the eighth pair of nerves; you may gueſs, then, whether the wounds they deſcribed were exactly what they believed them to be.

The reaſon for ſaying, in ſuch caſes (ſo eaſily cured), that the wound had paſſed through both the trachea and the œſophagus, is very ignorant: it is merely this, that the ſurgeon ſees both air and food come out by the wound, and no one ſcruples to ſay, when he ſees both air and food come out by the wound, that the trachea and œſophagus are both cut, while the fact is, that neither the œſophagus nor trachea are touched in the leaſt degree, that the wound is much above them; for a ſuicide always ſtrikes immediately under the chin; his wound, as far as I have obſerved, commonly falls in the line or lurk of the ſkin, which divides the neck from the chin:—That is the place where the os hyoides lies, and he commonly cuts the os hyoides away from its connection with the thyroid cartilage or pomum adami. Now, in that caſe, the thyroid cartilage, forming the uppermoſt part of the

larynx, is not touched; the Rima Glottidis lies below the wound, quite ſafe; the wound, indeed, ſeparates the epiglottis from the glottis, but it leaves the glottis and the larynx quite ſafe; it only ſeparates the larynx from the root of the tongue; it is properly a wound in the root of the tongue; it is rather a wound of the mouth than of the throat; and when the food comes out, along with ſpittle and froth, it is by rolling over the root of the tongue.

One thing more is to be remembered, that the firſt branch going off from the carotid artery, is the artery of the thyriod gland; that it comes off from the main artery at the angle of the jaw, and turns downwards along the ſide of the throat, to plunge into its gland. Now, as this artery lies along the ſide of the trachea on its upper part,—and as its tendency is forwards, towards the fore part of the trachea, where the gland lies, it is much expoſed, and is almoſt always cut;—the bleeding from it is terribly profuſe; the patient faints; and the ſurgeon naturally believes it to be the carotid artery; if the ſurgeon does not come early, its bleeding is as fatal as that of the carotid artery itſelf.

When a ſurgeon continues, during all the cure, to dreſs his patient daily, without knowing what parts are cut, or, in delivering the notes of ſuch a caſe, miſnames the parts; he is guilty of ſuch groſs ignorance, that he ſhould hardly be concealed. The following deſcription I introduce, chiefly for the purpoſe of illuſtrating what I have juſt told you;—it is extracted from a Medical Collection, and is entitled "The

hiſtory of a remarkable wound of the trachea and neighbouring parts."—" I found this man," ſays the author, " lying upon the ground, with his throat cut from ear to ear,—and an immenſe effuſion of blood."

" The external jugular veins, on both ſides, were perfectly divided,—the carotid artery laid bare,—the trachea arteria divided from the larynx, above the pomum adami. The epiglottis and glottis entirely detached from the Rima Glottidis;—the trachea cut through, except about a finger-breadth of the back-part, which was very much ſtretched; for the trachea, which was thus divided, had retracted equal with the clavicles."

This is a very ſingular inſtance of ignorance and confuſion: The plain ſtory is this, that the man, having cut his throat from ear to ear, had ſeparated the os hyoides, which lies in the root of the tongue, from the thyriod cartilage, which forms the upper part of the larynx; and conſequently the damage was plainly this; the mouth was cut open rather than the throat, the tongue was cut away from the larynx, and the epiglottis was ſeparated from the Glottis, Rima, or Chink, for this little opening has all theſe names.

To divide the trachea from the larynx, the cut muſt be under the thyriod cartilage, or pomum Adami; but the author tells us, that " the trachea arteria was divided from the larynx, above the pomum Adami," though the pomum Adami is itſelf the bulging of the larynx, and nothing is above it but the os hyoides and tongue; and he tells us next, that " the glottis and epiglottis were detached from the Rima Glottidis,"

as if the Rima Glottidis and the glottis were not actually the same. In short, the mistakes and absurdities of this kind which are to be found in books, are endless, and there could neither be pleasure nor instruction in pursuing this subject any farther*.

The chief difficulty lies in understanding the anatomy of the parts; for, as a simple wound, you know that in this, as in any other, you have but two points to attend to, to suppress the bleeding, and to procure adhesion. And both these points you will understand much better, by remembering what I have just proved to you, viz. that very commonly the wound is high betwixt the throat and the tongue; for this particular place of the wound makes it easy to prevent bleeding, but difficult to procure adhesion.

1st, The wound being very high, the carotid arteries are quite safe, for at the upper part of the neck

* Mr. Benjamin Bell has made a curious conjecture concerning wounds of the œsophagus: He says, "Wounds of the œsophagus are chiefly dangerous, on account of the difficulty of reaching it from its deep situation; and from the under part of the œsophagus, when entirely separated from the rest, being apt to fall altogether within the sternum; and from the difficulty of supporting the patient with proper nourishment," p. 167. Now, Mr. Bell, when he was guessing about this, might as easily have guessed, (since the back part of the œsophagus lies smooth against the fore part of the vertebræ), that whenever the œsophagus was so fairly cut across, as to sink under the sternum, all the parts of the neck must be cut, and nothing in fact left, but the vertebræ for the head to nod upon; in such a wound, viz. where the carotid arteries, jugular vein, and great nerve were all cut, I should conjecture, that the surgeon would not be long troubled about ways and means of SUPPORTING the patient with PROPER NOURISHMENT.

they retire ſo, that they are really under the angle of the jaw; and you will have obſerved, that in this very caſe, related by the ſurgeon, the throat was cut from ear to ear, and yet the carotids were ſafe; and the carotids were expoſed by the wound, only becauſe the wound extended from ear to ear. It is not the carotids that are touched in the common attempts of ſuicides—it is ſometimes from ſome of the lower branches of the lingual artery, but chiefly from the great thyriod arteries that the man bleeds. The perſon, who does this deed in ſecret, commonly faints and falls down. It is this fainting that ſaves his life. Theſe arteries are large enough to cauſe a fatal bleeding; we are, therefore, careful not to rouſe him from this languid ſtate, till we are ſure that we can command the blood. If, when we arrive, the arteries be ſtill bleeding, we apply the point of our fingers, ſtop the arteries, draw them out with the tenaculum, or tie them with the needle, for in this upper part of the throat the needle may be ſafely uſed; but often during the fainting, they are ſo retracted among the cellular ſubſtance, that we are ſaved all trouble and care, except that of making our outward ſtitches for uniting the lips of the wound.

2d, The REUNION of the WOUND is chiefly prevented by the continual flowing of the ſaliva, by the food rolling out this way, by the continual cough which the irritation of the now unprotected glottis occaſions, by the continual motion in the endeavours to ſwallow, and eſpecially by the tearing motions which take place whenever the tongue or the whole throat moves;

for the os hyoides, or bone of the tongue, is the very point to which all the muſcles which move the throat or tongue are attached.

Our chief object ſhould be, firſt to get the parts into fair and neat contact, ſo that not a particle of food nor of foam ſhould eſcape; and next, to prevent, by all contrivances and every kind of care, the leaſt degree of motion of the tongue, or parts about the throat. It is well known, that if parts do not unite early, it is not eaſy to make them unite at any after period; and yet I cannot tell how often I have ſeen the throat left gaping, to a moſt enormous extent, the ſaliva continually beſmearing the neck and breaſt, and the edges of the mouth-like wound as callous as the palm of the hand.

The effort to ſwallow cannot be entirely prevented, for the patient will, notwithſtanding your remonſtrances, continue to ſwallow the ſpittle, working continually with the throat; but his ſwallowing of food ſhould not be allowed. To nouriſh a man by glyſters, during this tedious cure, is impoſſible; you muſt, therefore, find ſome way of conveying food to the ſtomach, without any effort on his part, by an eel's ſkin, or by a flexible leather tube, ſuch as we uſe for injecting tobacco ſmoke, introduced into the œſophagus.

The continual draining of the ſaliva cannot be prevented otherwiſe, than by cloſing the wound neatly and effectually; it ſhould be cloſed with a number of ſeparate ſtitches proportioned to the extent of the wound. The ſtitches ſhould be neat and firm, through the ſkin and muſcles,—through all the fleſh that you

can get fairly, but not through the cartilages. In the interftices of the ftitches, you fhould lay neat flips of black court-plafter acrofs the lips of the wound,—you fhould lay a large flat adhefive plafter over all, to make it firm,—you fhould bring the head forwards, and bridle down the chin to the waiftcoat,—your patient fhould be ordered neither to fpeak nor to fwallow; and he fhould be enjoined rather to let the faliva trickle down the corners of his mouth, than to fwallow it.

In the difordered condition of his mind, large opiates will help to compofe him to reft, and may be ufeful in appeafing the irritation and cough; and you muft efpecially remember, that the prefence of fome friend is neceffary both to foothe him, and to watch over him. Often, indeed, he falls into a humble and penitent ftate of mind, and bears every thing quietly; but fometimes the fhame of what he has attempted, and the apprehenfion of appearing again in the world, makes him weary of life, wifhing that what is begun were completed; fo that fometimes I have been obliged to bind fuch unhappy people before they could be dreffed, and never could think of leaving even the moft compofed of them without precautions.

DISCOURSE VII.

ON DANGEROUS WOUNDS OF THE LIMBS.

I now come to a ſubject the moſt difficult of all; for it is not to be told merely how to dreſs a wounded limb, or to take up the arteries, or how to dilate the wound, or to extract the balls or the ſplinters of bone; theſe are duties exceedingly eaſy and plain: But there is a queſtion implied, which, from the earlieſt times of modern ſurgery, has been eſteemed a queſtion of high importance, viz. whether we ſhould amputate in dangerous wounds of the limbs; and yet all the ſurgeons of Europe, with the collected ſenſe and experience of the whole, drawn as into a focus, and bearing upon this one point, have left it ſtill undecided. Le Dran ſays, "Wherever there plainly is a neceſſity for loſing a limb, the ſooner it is done the better." While Mr. Belguer exclaims, "To cut off a limb after a bad wound, what is it but to add wound to wound? to heap new pains upon a diſordered ſyſtem? what is it but plainly taking away the patient's life *?" The

* Mr. Belguer's language is of a kind not to be tranſlated literal-

difputes in the French Academy upon this fubject have been endlefs.

It is natural for me to tell you how unwillingly I undertake the tafk even of explaining thefe opinions to you, much more of directing your judgment.—But although I know well how impoffible it is for any man to acquit himfelf to your perfect fatisfaction, fince doubts and fears will keep their hold upon your mind; yet this is a matter which cannot be flightly paffed over, fince the queftion muft return upon you daily in practice. In a wound of the breaft, or of the belly, we can do but little for our patient's fafety; we cannot root out the difeafe; there he muft lie and take his fate, to die, or to live. But when a limb is miferably torn by a ball, by machinery, by a loaded waggon paffing over it, you are thrown into anxiety not to be expreffed; both through an honeft fear of your patient's fafety, and alfo from apprehenfions, not unbecoming, concerning your own reputation. You may cut off the limb in the hopes of cutting off the difeafe; or you may try to fave the limb, at the rifk of your patient's life! But however wifely you may determine, full hardly fhall you efcape calumny! whether you cut off the limb, or whether you try to fave it, there is danger, there are authorities againft you on either hand: and of thofe authorities one reprefents amputation as fatal; another fays, that wherever the limbs

ly on almoft any occafion, and, leaft of all, when he is poetically inclined; for his figures are never of the elegant caft.—His expreffion for this is:—" Interrogo enim unumquemque ex medicis et chirurgis " annon hoc effet hominem jugulare."

are ſeverely ſhattered, the accident is mortal: if you hearken to the ill ſucceſs of amputation as repreſented by one party, you will think ſurely no man can be ſaved in this way! and if you liſten to the wonderful tales of others concerning recovery from ſhattered bones and lacerated limbs, you will be apt to exclaim, "How, after this cure ſhould any man be allowed to die," when really this cure ſo much vaunted, is but one caſe picked out of ten thouſand.

In a queſtion like this, you will find it prudent to read but one book or none; either to hold to the advice and practice of one ſurgeon, or wait till you ſee practice, and are brought to an individual caſe, and, unbiaſſed by doctrine, try to follow nature; try to learn, by a little experience, by ſlow degrees, and with ſome hazards, and ſome vexations, how much ſhe really can do for you; what wounds are only dangerous, and what wounds are abſolutely fatal.

Conſidering the great value of experience in ſteadying your mind, I hold it fit, firſt of all, to repreſent to you the nature and conſequences of fractured wounds, before I try to unravel the intricacies of the queſtion before us.

Wounds of the limbs, like wounds of the bowels, are dangerous in proportion to the value of the parts wounded; and this conſideration reduces the ſubject to few points, the wounds of great arteries, the wounds of bones, or the wounds of the large joints. But before I repreſent to you the particular dangers, I ſhall firſt relate the general treatment of any ſuch dangerous wounds. The damage done to a limb by a can-

non-ball, is much like that done by heavy machinery, or by a waggon-wheel paſſing over a limb, like thoſe accidents which happen daily in factories or in mines; both the one and the other conſiſts in a bruiſing and almoſt total deſtruction of the fleſh, a laceration of the great arteries, and fracture, or rather cruſhing of the bones; ſo that many ſmaller pieces are ſplintered and ſeparated, or ſometimes a middle portion of the bone ſqueezed entirely out of the limb.—Even the leſſer gun-ſhot wounds reſemble theſe in their dangers; for wherever a muſket-ball tears the arteries, and breaks the bones, the danger is very great; and therefore, it is moſt natural for me to begin this ſubject by explaining to you the manner of treating thoſe dangerous wounds, where, after all, I muſt ſeem to be employed rather in illuſtrating the dangers of ſuch caſes, than in adviſing a method of cure.

OF DANGEROUS WOUNDS GOING DEEP AMONG THE FLESH.

If a muſket-ball have made a fleſh wound, attended with great ſwelling, you ſhould dilate it; being eſpecially careful to cut the faſcia, as for inſtance, in the thigh, and to divide the fibres of the muſcles, not croſſways, but lengthways. If the ball have made a deeper wound, and hurt the bones, if the tibia and fibula be broken, or the ball have paſſed through the foot or hand, you have much to do; you muſt dilate freely,—make ſo large an opening that you put your finger down into the wound, and get the ſplinters of bone away, or the ball if it remains, or pieces of cloth,

or boot or harneſs; and though ſometimes balls will be cloſed up in the heart of bones, or pieces of bone will be reunited, though apparently too large to be reſtored, ſtill you are not to truſt to ſuch chances, but muſt endeavour to get the ball away with forceps, to cut the piece out with the trepan, to pull away the looſer bones with your finger, to ſeparate alſo thoſe which are ſhaking, but yet connected. All this you may do without being too curious in your ſearches, and pieces of bone, very long and ſharp-pointed, lie often in ſuch a manner in the wound, that while they remain, the bad ſymptoms cannot ceaſe.

When the firſt inflammation comes on, you may find it neceſſary to bleed; but you will be inclined to do it with diſcretion, when you think of the long confinement and many dangers which your patient has to endure. When theſe firſt inflammations are over, your patient falls into that condition which I have formerly deſcribed: At firſt, a mild ſuppuration forms, by and by it becomes profuſe, and ſoon after this profuſe diſcharge, has a manifeſt effect upon his health; there is a large gleeting ſore, looſe and carious bones, fever, diarrhœa, and a great declining of ſtrength; and after this change, the ſupporting your patient's ſtrength is your chief buſineſs during all the cure.

When acceſſions of fever come on with a frequent pulſe, heat, thirſt, and a furred tongue, and a languiſhing and ſickly feeling, which portend a more violent diſorder, this is the approach of a fever not to be ſubdued by bleeding: It is the infection of a foul hoſpital or ſickly camp; it may be, perhaps, from

the gleeting of his extenſive ſore, or from the putrid ſmell of it; and this fever is to be combated with bark and wine. You ſhould give your patient a vomit in the morning, and an anodyne with a draught of warm wine at night; and indeed, in the cure of any wound by which a patient loſes much blood, you ſhould begin by giving him ſpirits and water, or wine; next day, you order the bark in two, four, or ſix dozes a-day according to the occaſion, and ſhould accompany it with laudanum, if it be likely to be thrown up, or with rhubarb and ſome aromatic powder, if a diarrhœa prevails. The patient is ſometimes coſtive, and ſhould have a doſe of rhubarb and aromatic powder, or of magneſia and cinnamon given him; and he is often ſick, for which he ſhould have a cordial provided of centaury gentian, and marmalade of oranges infuſed in ſpirits or wine; which, being mixed with pepper-mint and cinnamon waters, ſhould be given a glaſs full two or three times a day.

Often there is a ſudden attack of fever in the morning, and all is quite at night; often the fever takes a diſtinct ſhape, with a hot, cold, and ſweating ſtage; often it leaves merely a debility, ſhivering coldneſs, and ſickly ſtate; too often the patient falls into the hoſpital fever, his wound mortifies, and he dies. All theſe changes are to be carefully watched, and are guarded againſt by emetics, and opiates, wine prudently given, and, above all, the fever ſhould be met with large dozes of bark, which you will adminiſter in various forms, joining it ſometimes with cordial infuſion, ſometimes with ſnake root, or with ſugar and

ſome eſſential oil in the form of an electuary.—With theſe medicines you fight againſt the febrile attacks: and you ſtrive to keep your patient in health, during his tedious cure, with generous diet and wine, careful attendance and cleanneſs, and great care to keep his wounds from being neglected or foul.—During this lingering cure, you have, from time to time, new inflammations with great pain, new abſceſſes, increaſe of the diſcharge, a flabby wound, and alarms, and interruptions of every kind; then looſe pieces of bone preſenting themſelves, which you are obliged to work out with no little pain. And thus, after eight months or more of pain and ſuffering, your patient begins to move about a mere walking ſhadow.

This I ſhall preſently prove to you, is a true repreſentation of the ſufferings and eſcapes of thoſe who recover from ſuch wounds; but firſt I ſhall notice ſome other caſes. Often, let us do what we will, even this much cannot be obtained upon ſuch eaſy terms; the limb falls into gangrene, and the patient is for ſome days in the moſt imminent danger of ſinking all at once; the limb becomes livid and cold, ſmall veſicles ariſe; it loſes all feeling, and becomes black and thoroughly mortified down to the bone. Then the ſurgeon begins his ſcarifications; he ſcores the gangrened parts with inciſions which go down through the dry cruſt of the gangrened ſkin, he carries his knife through the maſs of bloody and corrupted fleſh, down till it touch the ſound parts, or till it touch the bone; he makes his inciſions long in proportion to

the gangrene, at an inch or more diſtant from each other, is careful to avoid the great arteries, or to tie them if they happen to be cut, applies poultices, and when they have ſoftened the hard ſkin, ſcrapes away with his knives the putrid maſs which covers the ſound fleſh, or which goes perhaps down to the bone. Now it is common to ply the wine, and to lay hot and ſtimulant dreſſings over the ſores; to make embrocations and turpentine dreſſings, which are applied upon rags dipped in the hot balſam; and it is uſual to lay ſome ſtimulant fomentation over all, wrapping the limb in cloths ſoaked in decoctions of chamomile ſharpened and made ſtimulating with ſolution of ſal ammoniac and nitre, or by the addition of vinegar or wine. Or to quicken and bring into ſuppuration the ſurrounding parts, ſpirituous fomentation with camphire or ſal ammoniac are uſed; or fomentations are made of wormwood, rue, chamomile, &c. with the addition of camphorated ſpirits.

Theſe applications are meant to correct the fetor of the dead, and ſtrengthen the action of the living parts; and whenever the line of ſuppuration forms, and healthy pus begins to appear through the putrid ſloughs, the ſtimulant medicines are left off, and the pus encouraged by the more natural application of an emollient poultice; and the ſpoiled bones are taken away, or the exfoliating pieces killed thoroughly, and ſeparated by boring with the trepan, or with the perforator. Above all, this rule muſt not be forgotten, that emollient fomentation, and the common poultice, are fitter for the ſmaller wounds of muſket-balls, as, in

the fore arm, the leg, the joints, in flesh wounds, in short, in all those wounds which we dilate for the purpose of preventing tension, and which, therefore, are less apt to run into a broad or general gangrene. The spirituous fomentations are fitter for the bruises of great balls, or for the stumps of limbs shattered by the great balls; and the balsams, turpentines, and other hot dressings, are best in open gangrene, where the scarifications are used, or in an open and gangrenous stump.

OF BROKEN OR DISLOCATED BONES.

A great ball, grazing obliquely, often breaks a bone or dislocates a joint, and yet does not harm the skin; and where this happens, you can seldom prevent gangrene: Very often the skin is blackened into a perfect eschar, the blood that is extravasated below the skin is mixed with muscles beaten into a mere mash; and the bones within, are broken into many pieces, the periosteum being thoroughly destroyed. In this case, you must make your incisions through the dead skin, as in a gangrened part, and apply your hot turpentines and your stimulant fomentations; and after the natural suppuration, or after your incisions, you search down to the bones, take away those that are loose and broken, and compose those which are to remain, by laying the fractured limb upon a small pillow, smoothing and setting the fractured bones with your hand.

But if the bone only be broken by the weight of the ball, while the ſkin is untouched, you muſt not open the ſkin! perhaps the ecchymoſis may be abſorbed, and the parts injured in their texture may be reſtored; you are, therefore, not to open the ſkin, but to compoſe the bones which you feel broken, to lay them gently with your hand, and to ſet the limb eaſily, as in any common fracture of the ſame bones; and moiſten your bandages with fomentations of the diſcutient and ſpirituous kind.

OF WOUNDED ARTERIES.

Thus you perceive that fractures of the bones, beſides the unavoidable attendants, viz. large ſuppurations and tedious cures, often end in gangrene.—But all theſe dangers muſt be increaſed when the artery alſo is wounded; in ſuch caſe, your inciſions muſt be free, your arteries muſt be fairly taken up, and you muſt watch the gangrene, and the time of the ſecondary bleeding: But, in this caſe, your patient's ſafety chiefly depends upon your doing your operation boldly at the firſt, with a free inciſion, and tying the artery ſecurely. Belguer forbids amputation, while one rag of the member remains; and will not allow it to be done in caſes of wounded arteries, any more than in ſhattered bones: Let the ſurgeon, ſays he, ſuppreſs the bleeding by agaric or ſtyptics, or let him take the arteries fairly up. Nor will he allow of amputation, even after wounds in the main artery of a

limb. But we muſt not allow the violence of an enthuſiaſt of this party to prevent our du y; for we feel too often the difficulty of ſaving the limb, even in a ſimple caſe, to doubt of there being moſt imminent danger in ſuch a complicated wound: Often, very often, limbs are loſt when the femoral or humeral arteries are wounded with the clean cut of a knife.—What iſſue, then, have we to look for in a wound of the main trunk, attended with a bruiſed and gangrenous ſore, and with fractured bones.

Perhaps, then, the ſhort rules of this caſe might be theſe: 1ſt, If the artery, even of the thigh, be wounded, with merely a fleſh wound, we muſt try to ſave the limb, though that will not be eaſy. 2d, If the artery of the thigh or arm be wounded, together with fractures of the bones, there is no reaſon to hope that the limb can be ſaved, and making the attempt is but riſking the life, for a very ſlender chance of ſaving the limb. 3dly, Though the tibial and fibular arteries in the leg, or the radial, ulnar, or interoſſeous arteries in the arm, be wounded, although it be with a fracture of the bones, the leg or arm may ſometimes be ſaved (but that with great difficulty, and not without danger) by cutting up the wound, tying the arteries, and picking away the ſplinters of bone.

OF WOUNDED JOINTS.

The wounds of the joints are ſo dangerous by thier high inflammation, that they may be fairly enough

compared with wounds of the great cavities, inflammation, and pain, and violent fever enfue; often the patient dies delirious on the firft days, or if he furvive thefe firft dangers, it is to die by a great flow of matter, hectic fever, erofion of the cartilages, and fpoiling of the bone; and neither can bleeding appeafe the inflammation, nor opium relieve the pain, nor bark nor diet fupport him under the vaft difcharge. We here pronounce more freely the opinion which we too often need to deliver in common practice, that openings into inflamed joints are fatal; and though there are in every book cafes of anchylofed joints, we cannot but remember, that for one that has efcaped by anchylofis, thoufands have died. In this cafe, viz. of wounded joints, bleedings, poultices, and emollient fomentations, conftitute almoft the whole that furgery can do. The wounds are to be dilated, the fragments of bone extracted, the patient laid quiet, and the limb as eafy and foft as may be; nothing fhould be fuffered to difturb the patient; he fhould have large opiates given him, to abate the irritation and exceffive pain; and, though bleeding may perhaps be allowable at firft, yet our chief difficulty lies in fupporting the ftrength of the patient during the tedious cure.

This laceration of a limb in which its bones are broken, and its texture apparently deftroyed, where the danger of gangrene is immediate and preffing, and where the chance is but poor of faving the limb, even after thus rifking the life, requires immediate amputation. The laceration of the great arteries, accompanied with driving of blood among the mufcles,

and with fractured bones, is alſo a caſe requiring immediate amputation. The wound of a joint, although in the end it commonly occaſions the loſs of the limb does not in general run into immediate gangrene; there is of courſe time to attempt a cure, and the opportunity of ſaving the patient's life is not abſolutely loſt by that delay.

OF BRUISED AND GANGRENOUS STUMPS.

There is but one caſe more to be explained,—that is, the dreſſing of a ragged ſtump made by a great ball; for, thoſe who condemn amputation in other deſperate wounds, treat this alſo as a mere wound, and will not allow any thing like a new amputation to be performed, but dreſs the ſtump in the following manner*: When a ſoldier is brought into the camp with a thigh or arm ſo ſhattered, that only ſome ragged fleſh or ſkin remains, they cut that away, then with the ſcalpel they cut the ragged fleſh as neatly as may be into the form of a regular ſtump, then cut the larger pieces of bone away with a little ſaw prepared on purpoſe; the leſſer fragments they cut away with the ſcalpel, and they pick the ſtump clean with the fingers or with ſmall forceps, (ſome ſmaller fragments, no doubt,

* I mean, in the following deſcription, to repreſent this practice of Belguer, the celebrated Pruſſian ſurgeon;—and merely to repreſent it to a well informed Engliſh ſtudent, is, I believe, criticiſm enough.

being left for ſuppuration). Then ſqueezing and handling the bone, they try to mould the remains of the limb into the faſhion of a ſtump, the fleſh being thus preſſed down to cover the ſhattered bones, and the bones themſelves ſo arranged by the preſſure, that if they be ſplit upwards, the ſplit is forced together, and ſuch fragments as may be preſerved, are made to adhere; at leaſt, Belguer plainly ſays, that by ſuch preſſure the fiſſure of a ſplit bone may be leſſened or cloſed. There is often no bleeding, no arteries are taken up; and ſometimes theſe ſtumps never bleed during the cure: The ſtump is dreſſed dry with lint, rolled with a gentle bandage, firm rather than looſe, and the ſtump and bandage are thoroughly ſoaked in ſpirits of wine. At every future dreſſing, the ſurgeon is obliged to look for new ſplinters of bone, and often to give new pain, by new pickings of the ſtump; and the truth is, that ſuch ſtump is even from the firſt moment little better than a gangrenous ſurface, with a black and bruiſed appearance, ragged muſcles and blackened ſkin, tendons hanging from it, and ſhattered bones remaining, which the ſurgeon dare not, or cannot take away; and almoſt from the firſt the ſurgeon is obliged to uſe hot dreſſings, turpentines, and balſams, to correct the fetor, and ſuppreſs the profuſe gleety diſcharge. But the eſchar which is eſſential to a gun-ſhot wound, the whole of the blackened and mortified ſurface having ſloughed off, there is danger of a ſecondary bleeding; and the ſtump originally ill formed (and which all this ſqueez-

ing and modelling could not bring into a right ſhape), now loſes much of its ſubſtance; what is left being pale, flabby, and ill conditioned in the laſt degree, accompanied with that profuſe diſcharge of which the patient ſo often dies; there is an exfoliation of bones which ſeldom is completed in leſs than ſix months; and at the end of this tedious confinement, the patients go out from the military hoſpitals with ſtumps where the bone projects, covered with a thin cicatrice, ſeldom without ulcer, or at leaſt ready to break out into ulcer with any rude touch; ſuch as reminds them every moment of their loſs and of their unhappineſs. —During the whole of ſuch a cure, we have to be as watchful of bleedings, as diligent in extracting and cutting the diſeaſed bones, as anxious to keep off fever, and prevent the diarrhœa or the gleeting from deſtroying the patient, as even in the ughieſt fracture of a limb; and yet without the comfort of preſerving a limb, which, however awkward, would be much more uſeful than a conical and tender ſtump. There remains but one thing to complete the view of this caſe, and I ſay it boldly, that even this imperfect cure is ſeldom accompliſhed till after labouring thus, through every danger, for four, five, or ſix months; and I appeal to the writings of Belguer himſelf, who ſeems as proud of ſuch a diſtreſſing ſcene, as if all were well and eaſy with the patient! Even this is what he boaſts of as one example of his ſucceſs!

I have now explained to you all the varieties of wounds in the limbs; the wounded joint, the lacerated artery, the bones fractured and luxated, and the whole limb carried away: Nor was it poſſible for me to explain the practice in theſe ſeveral accidents, but by repreſenting the dangers of each caſe. I have been guided by no ſecret deſign of exaggerating the difficulties of ſuch wounds; and yet the ſimple truth cannot but impreſs your imagination very ſtrongly. It is, indeed, a ſcene which muſt alarm you, and make you ready to pronounce: "There is no way ſurely of ſaving our patient, but cutting off of ſuch limbs." But that you may be warned againſt all haſty concluſions, that you may have all reaſonable hope and confidence in the powers of nature, I ſhall deliver ſhort notes of a few choſen caſes; they will prepare your mind with knowledge, for the great queſtion which I propoſe next to explain to you; I mean, Whether, in ſuch diſtreſſing circumſtances, the limb ſhould be cut off or not?

You will not be ſurpriſed, to find me begin with relating the ſucceſſes of Mr. Belguer; for you have heard of his great name.—He was chief ſurgeon to the laſt King of Pruſſia, and had the command of all his hoſpitals. He had ſeen the ill conſequences of amputation in the former years of the war, and reſolved, that, from the date of his authority, not one amputation ſhould be performed; and accordingly, from the date of his command, not one amputation was performed in all the Pruſſian army. Full 6000 wounded men were left to ſink or ſwim; for, how

much foever a leg or arm might be lacerated, amputation was not allowed; if fuch a limb could be cured, it was cured; if it gangrened, the gangrenous mafs was fcarified and fcraped away. If there was an entire fphacelus, and the leg fell off, the Pruffian furgeons did no more than merely fever the dead bones from the half dead flefh, leaving the rotten ftump to heal, if it could heal.

Now, when all the wounded of a camp are left thus, with wounds of all kinds, to take their fate, to live or die, it is no wonder, though fome very fingular cures appear; and, therefore, there is no book which we fhould fooner look into for miraculous cures, than that of Mr. Belguer.

Mr. Belguer conducted himfelf through his plan with a wonderful perfeverance, and ftood out fcenes of diftrefs, which I fhall reprefent to you by and by; at prefent, it is rather my bufinefs to prefent you with fome examples of his fuccefs.

He cured a foldier, whofe arm was fo miferably torn by four grape fhot, that the humerus was broken in the middle. There was an anuerifm, as big as a fift, at the bend of the arm; but whether of the main artery or not, he does not fay. The wounds were dilated, the broken bone laid bare, feveral large fplinters taken away, and the remaining fplinters fmoothed and applied to each other, by moulding the arm with the hands, and rolling it with a gentle bandage, moiftened with fpirits of wine. He laid thick hard compreffes, and a tighter bandage, over the a-

nuerifm; and thus, without further help, he performed the cure in three months.

He gives, next, another cafe of lefs importance, of a wound of the fore arm, cured by the fame procefs, of dilating the wounds, and extracting all the fragments of bone.

Next, one of an officer, who was wounded with a ball in the middle of the leg, had betwixt three and four inches of the bone cut away, and yet was healed.

Next, of a foldier fo wounded in the leg, that Belguer cut away no lefs than five inches of the tibia, and picked the fplinters of the fibula away, put the bones together, and accomplifhed the cure, though not without a great fhortening of the limb.

Next, of a nobleman of the name of Francken-berg, who was fo wounded in the foot with a mufket ball, that his furgeons hooked out, in a manner, all the bones of the foot, and yet he recovered fo as to walk with a high heel.

An enfign recovered from a wound, with fractures of the leg.

A foot foldier, of the name of Mieke, had his arm fo battered by a cannon ball, two fingers breadth below the fhoulder joint, that five inches of the os humeri were taken away.—Yet, in nine months he recovered, but was ranked as an invalid.

An officer having received a wound, or rather a bruife, very like this, was cured in eight months.

Two officers, who were wounded in the fhoulder joint, were cured in about ten months.

A gentleman, of the name of Britzke, who was wounded with a muſket ball in the elbow joint, was cured in two years.

The caſe of one of his princes brings up the rear:—He had been wounded in the foot, at the root of the metatarſal bones; and though the bones of the tarſus were much broken, he was, by inciſions and balſams, reſtored to the troops.

Of 300 who were wounded in the limbs, and with fractured bones, theſe are the examples which Mr. Belguer has choſen as ſurpriſing cures.—But how naked and bald of circumſtances theſe caſes are, I need not explain to you;—you muſt feel that from a want of detail, they are but ill calculated to make any laſting or lively impreſſion on your minds; but the bareneſs of theſe caſes will be compenſated by the intereſting nature of others, which I ſhall now relate.

M. Boucher, a French ſurgeon, cured a young man of nineteen, of a vigorous conſtitution and ſound health, who was ſhot with a muſket, at ſo ſhort a diſtance, that the ball, paſſing clean through the thigh-bone, wounded a woman, who ſtood near him, in the foot. The thigh bone was broken juſt above the condyle; it was ſo ſhattered that about four inches of it were taken away in ſplinters: The ball did not injure the artery, nor touch the joint; but the man being drunk, did himſelf much harm in attempting to riſe. On the following day, there being much ſwelling, fever and pain, amputation was propoſed to him; but he refuſed to hear of the operation, and his ſurgeons were bound to do their beſt to ſave his life; they took

away many splinters of bone, dilated more particularly the backmoſt wound, that the matter might be more freely diſcharged: There followed three ſuppurations around the knee, but none of them apparently affecting the joint; the openings for theſe abſceſſes diſcharged more ſplinters of bone; the inflammation ran high, gangrene came on; at laſt, a line of ſeparation appearing, dividing the mortified from the ſound parts, amputation was now a ſecond time propoſed; but the conſultants could not agree:—A ſlow fever and diarrhœa waſted him for a month longer; but ſtill he lived. Now, in the third month, new ſuppurations appeared in the upper and inner part of the thigh; another collection of matter formed under the faſcia lata on the outſide and top of the thigh. Theſe abſceſſes were freely opened, and diſcharged ſome more bones; the ſuppuration, notwithſtanding the patient's irregularities, went on well, and in ten months the abſceſſes were entirely healed. Then the bones knit with a firm callus, the joint played freely, the limb was ſerviceable and ſtrong; it was ſtraight alſo, but it was four inches ſhorter than the other, which was exactly the extent of the wound in the bone.

In this caſe, the bone only was wounded; there was no wound of the joint, no hurt of the artery; and yet the cure was not accompliſhed till after ten long months of ſuffering, with fevers, diarrhœa, painful ſuppurations, and profuſe diſcharge.

Mr. Theri attended one of the ſervants of a monaſtery, who, while holding the bridle for one of the religious, was wounded by his piſtol going off as he

was mounting. The wound was in the elbow joint. The ſhot ſtruck the condyle of the os humeri, and carried off alſo the olecranon. The uſual inciſions were made; but the ſwelling was ſo great by the fifth day, that his ſurgeons were obliged to make new inciſions of the wound; they were moreover obliged to cut up the faſcia of the fore arm. The inflammation, ſtill advancing, extended quite to the ſhoulder, and threatened gangrene: The ſcarifications, bark, and ſtimulant applications, ſaved the arm from total gangrene; but after this, abſceſſes formed all round the fore arm: But theſe ſufferings and dangers being over, the patient was cured in eleven months: It is very ſingular, that by the uſe of baths he recovered even the uſe of the joint. In this caſe, as the gangrene was actually begun, the patient made a narrow eſcape.

An officer of the Iriſh Brigade, alſo wounded in the elbow at the battle of Fontenoy, had the lower part of the ſhoulder bone fractured with the muſket-ſhot, and the olecranon much damaged, though not entirely ſhot away. He alſo ſuffered ſuch dangers, that he was condemned by his ſurgeon, Mr. Guerin, to ſuffer amputation, and had given his conſent; but, prevailed on by the tears of his wife, he retracted this promiſe. He alſo was ſaved from gangrene by the ſcarifications and other means; the dreſſings were thoroughly ſoaked with a bloody ſerum, which augured no good, and many ſcales of bone were diſcharged before his ſurgeons could accompliſh the cure; the cure alſo was leſs perfect, ſince it was not accom-

plifhed but with a ftiff joint. The period of this cure is not recorded, but we fee that he efcaped from great dangers even in the firft inftance; and we are told by the author, that his cure was tedious and very painful.

Mr. Boucher cured alfo another young man wounded in the thigh bone. The ball had paffed through the condyle; but fo tedious was the cure, that, during his confinement, the other leg grew fo much, that though the wounded thigh bone was touched only in the condyle, and nothing abridged of its length by the fracture, the young man, by the growing of the found leg, while the wounded one continued ftationary, had a great halt in his gait. This young man, you will eafily guefs, muft have fuffered much to obtain this cure: There were firft deep incifions made into the two wounds, then many fplinters of bone pulled away; then turpentine dreffings were applied, and great pain and fwelling, convulfions alfo coming on, they were on the fixth day obliged to cut the ham-ftrings, and to make long incifions quite up to the middle of the thigh. Eleven months was the period of this young man's cure; and furely, in confinement, fever, and difcharges of bones, he bought it dearly.

One man, recovered under the care of Mr. Boucher, who was fhot acrofs from the inner to the outer ancle; and another patient had the head of the fhoulder-bone broken by a ball; which, paffing from behind, forwards, raked along the courfe of the clavicle, till it came out at the end of the clavicle, next to the fter-

num. There were, in this caſe, ſhiverings, fever, and an ill-conditioned diſcharge. Inflammations and great ſuppurations extended quite down the fore arm, and he left the hoſpital not till after nine months diſtreſs, and with a fiſtula in the joint, which mineral waters cured at length, ſo that he could do every thing but raiſe his arm.

In beſieged cities, or in the trenches before a beſieged city, moſt of the wounds are from great ſhot, or by bombs, or by great ſplinters of ſtone; and, in ſuch wounds, the limbs are ſo miſerably broken, that in moſt of the caſes, amputation is neceſſary; and ſo well eſtabliſhed is this maxim, that Mr. Cannac of the French Academy pronounces this opinion even while he is in the very act of relating one of the moſt wonderful recoveries that ſtands upon record. It is the caſe of an engineer who was wounded with a bomb; the bomb threw him down, broke the leg and foot, and ſo ſhattered all the bones, that the leg bended in one direction, the foot hung away in an oppoſite direction, ſeveral inches of the tibia and fibula were pulled away, and many pieces of the bones of the foot were diſcharged; and but a few days after this wound, the French being obliged to fly from the city, which was beſieged, were forced to carry him in this miſerable condition to Cambray. No wonder that, in the very firſt conſultation upon ſuch a wound, amputation was propoſed, and was freely conſented to; but, by many ſucceſſive accidents, it was deferred and deferred again, till the moment in which they were obliged to fly.— After various dangers (which, from what I have ex-

plained to you of such cafes, it were very needlefs to relate), he did recover; but it was fuch a recovery, that Mr. Cannac declares, that his long fufferings and imperfect cure being confidered, it had been better for him that they had cut off his leg; for it was fhort, and deformed; and he fuffered eight years of operations, dreffings, and mineral waters: The patient was two years under the immediate care of his furgeons, and fix years more wandering about watering places, with open fores, and exfoliating bones. Eight years, in the flower of life, are a dear purchafe even for a perfect cure.

The cafe, with which I fhall finifh thefe fingular inftances of fuccefs, is that which immediately follows in Mr. Cannac's Differtation, and which he joins to this with great fenfe and judgment; for it makes the leffon complete. An officer in the fame befieged city was wounded in the ancle with a hand-grenade;—and, believing himfelf more frightened than hurt, he tried to walk out of the work which he commanded; but his leg was benumbed, and his foldiers were obliged to carry him out. The wound was merely a flefh wound, an inch and a half in diameter; there was no wounded artery, nor any appearance of a broken bone, but it was of courfe a bruifed wound. I need not relate to you all the fymptoms, the tenfion, and fwellings of the limb, the threatening of gangrene, the floughings and incifions, all the fufferings of the patient, and all that was done for him. The whole is told in one word: He had feen the officer, juft mentioned, faved after a more terrible wound. Mr. Cannac propofed amputa-

tion; but this gentleman refused, and his expectations raised too high, from what he had witnessed in the other case, cost him his life.

Thus have I given you a fair transcript of many wonderful cures; and the best comment, perhaps, that I can make on them, is delivered in the following sentence of Mr. Boucher: "Decided as I am in writing against amputation, and great as my confidence is in the powers of Nature, I confess, that we ought not to look for miracles, nor trust blindly to her powers. There are many cases, where we can have no reasonable expectation of saving our patient, but by cutting off his limb *." This is the great question to which all the cases above recited tend. It was to show the dangers of amputation, that they were mustered up by the French and Prussian surgeons, but every effort of this kind, if we take it in the right sense, will but alarm us, and not quiet our minds. You have had these cases translated to you fairly and honestly. But in glancing your eye backwards, you see, in true perspective, all the dangers of a nine months cure, which is but a weary travel, step by step, betwixt life and death. You have, in this view, the dangers of frequent fevers, wasting diarrhœas, foul and gleety sores. You see some dying suddenly of gangrene, some wasted by the profuse discharge, and successive suppurations,

* Page 109.

new incifions, unexpected difcharges of fpoiled bones; you fee thofe who recover, halting on limbs fo deformed and cumberfome, that they are rather a burden than a help. You know, in the very moment that you hear of fuch a cure, how much the patient muft have fuffered, and how poorly he has been cured; and you can, from the long fufferings of thofe who efcape, tell, but too truly, how many muft die.

From thefe reflections, you will be inclined to prejudge the great queftion of amputation, or of faving the limb. But however you pronounce on that point, I befeech you to learn the following humane leffon, from the practice of thefe, the greateft furgeons in France: When your opinion is called for, pronounce it boldly; and fay, if you think it right to fay fo, this limb muft be cut off. But when you are prevented by officious relations, or if the patient fhould refufe his confent, when the accidents of the cafe interrupt you, or you are in an irregular and dangerous camp, where operations cannot be done, then do whatever remains of your duty, not with the ill humour of a man thwarted in fome little view, or fmarting under the fenfe of a difappointment or affront; fet yourfelf heartily and kindly to fave your patient's limb and his life.

DISCOURSE VIII.

ON THE QUESTION OF AMPUTATING SHATTERED LIMBS.

THE beſt operations are ſometimes abuſed, and ſo is amputation abuſed: the moſt dangerous remedies are ſometimes required, ſo is amputation. I do not admire the reaſoning of thoſe who, through an affected confidence in the powers of Nature, are continually declaiming on her miracles, her wonderful powers, when they ſee hundreds dying around them on every ſide! Where is the deadly diſeaſe from which ſome few have not been reſtored? Theſe men have the talent of repreſenting one ſingle caſe as an argument againſt a general practice; they bring a few ſucceſsful cures into the full light, while their conſcience tells them that hundreds are dying in ſecret. Nor can I, on the other hand, reconcile myſelf to the practice of thoſe who are ſo proud of ſurgical operations, that nothing ſeems well done to them, unleſs it be done with the knife, I may ſay, by main force of ſurgery. Theſe ſurgeons ſet themſelves, not over Nature, to regulate or aſſiſt the operations, but above Nature, to controul and force them. Feeling as I do the danger of either

extreme, I ſhall endeavour to direct you in this difficult queſtion, Whether in certain circumſtances you ſhould amputate the limb, or try to ſave it? I ſhall endeavour to direct you to the ſenſible and modeſt plan of conduct; and lay before you ſuch rules, as will enable you to aſſume a conduct neither too timorous, nor too forward.

Allow me to ſay to you, firſt of all, that queſtions of practice ſhould be decided, not by authorities, for theſe are the opinions of men, of mere men; and we know too well how ſtrangely a man's opinions grow up in him, diſtorted by a thouſand accidents. But they ſhould be determined by reaſon and experience, which is the true baſis of opinion; for, after all authorities are laid down before us, ſtill the true ſpirit and reaſon of our rules remains in the nature of the thing itſelf: if we can once find out that reaſon, it muſt ſerve as the principle of our practice; and though opinions, authorities, and names, might put us wrong, that will never deceive us.

If there be a great fracture of the elbow or knee, who ſhall deny that the man may live and recover? But are there not a thouſand alarming reaſons to believe that he will die? If there be a fracture of the tibia and fibula, and if at the ſame time the great blood veſſels are cut, is it not poſſible that our patient may eſcape this terrible complication of aneuriſm, fracture, and bruiſed wound; may he not recover from the gangrene; may he not outlive the diarrhœa and profuſe diſcharge; may not the fever be kept under: but ſtill the queſtion comes upon us, may he

not rather die? Then, if ſo, it is the duty of the ſurgeon to pronounce, that though he may live, there are many chances that he may die; and though fifty recoveries ſhould be produced from books, that would not bias his judgment. He knows all the dangers, and fears them, and adviſes amputation; but if it be refuſed, he is not offended; and as he feared theſe dangers, he rejoices if his patient eſcape from them.

The ſetting up exceptions as an argument againſt general rules, is very poor reaſoning; ſince every exception does in fact prove its own rule. This manner of reaſoning is moſt dangerous to the young ſurgeon; it hurts his mind, makes him irreſolute and timorous, where he ſhould be moſt decided and bold; obedient to the ignorant fears or wiſhes of his patient, when his patient ſhould rather be ſubmiſſive to him, confident in his judgment, and contented with whatever he reſolves. Does not Mr. Boerdenave himſelf, the chief of thoſe who have argued againſt amputation, acknowledge to us, that ſuch ſucceſsful caſes are deceitful? He concludes a long liſt of wonderful cures, with this remarkable ſentence: "I know well how many examples are related of wounds of the bones and joints cured without amputating; but thoſe examples, ſeducing to ſuch only as are little converſant in practice, never can eſtabliſh a general rule *." General rules and particular exceptions are oppoſite, and yet neceſſary to each other, like light and darkneſs, without the one the other cannot be diſtinguiſhed.

* Page 233.

I ſhall go once more over the points of practice which I have lately enumerated, taking them up in their order, of a ſhattered ſtump, fractured bones, wounded arteries, and open joints.

---

1. OF SHATTERED LIMBS.

Mr. Belguer, in the very ſecond paragraph of his book, declares, that he had often cured thoſe, who, having the leg or arm ſhot away by a great ball, would, according to the common practice, have ſuffered a regular amputation of the ſtump. Now, if Mr. Belguer means to ſay, that it is better to clip and pare ſuch a ragged ſtump than to cut it off, his opinion amounts to this plainly, "that the lacerated ſtump left by a cannon ball is as good a ſtump as one made by a regular amputation, is even leſs dangerous;" and it would follow, if this were true, that all our trouble about neat amputations were very fooliſh; why indeed ſhould we not return to the old method of Botallus, namely, by the guillotine, for that would make a clean amputation, as quick, and with almoſt as little pain as even a cannon ball; but it would leave a ſtump, I fear, little better than thoſe which Belguer would palm upon us for good ones. Although, after all, partly from modeſty and conſciouſneſs, perhaps from prudence and a fear of contradiction, he does acknowledge to us, that he cured ſuch ſtumps only ſo ſo, "ſatis quidem pro noxæ ratione feliciter curato."

But although Belguer had ſaid boldly, without this qualifying expreſſion, that he had eaſily cured ſuch ſtumps, he could not have been believed. We muſt examine every ſuch point, no doubt, by authority in the end, but firſt of all, by the nature of the fact itſelf.

I aſk whether it be in the nature of things that we can bring into the condition of a ſound and healthy ſtump, ſplintered bones ſplit up to the heads, joints ſhaken and bruiſed, ragged muſcles, and ſtrings of tendon and ſkin hanging round the ſtump, and a whole ſurface ſo nearly in the condition of proper gangrene, that it hardly can eſcape? How ſhall we take up arteries which cannot bleed, but which are ſoon to fall into gangrene and bleed when we are leaſt prepared? How ſhall we reſtore to any ſound condition, parts ſo deſtroyed in their form, and ruined in their texture, and in their vital powers, that they can be cured only by ſloughing, i. e. by gangrene? How ſhall we clip this ſtump into any ſhape, or pick away the looſe bones, or roll and compreſs the ſplit ones as Belguer directs, without operations more painful and far more tedious than actual amputation?

If there be much difficulty in healing a regular and good ſtump, what muſt not the danger be of ſuch a ſtump as this? Where no veſſels bleed, where none are tied, where, in the courſe of the ſloughing, dangerous arteries will burſt out, where a ſtump already ill formed and irregular, muſt ſtill loſe ſomewhat of its ſubſtance by the ſloughing of the bruiſed fleſh. Indeed, in ſuch a caſe, a conical, ulcerated, and painful ſtump will be the only reward for long ſuffering, and

many tedious exfoliations or ſawings, perhaps, of the fractured bones.' No wonder that we have ſuch a modeſt declaration from Belguer, we cured ſuch ſtumps ſays he, in four or five months, "ſatis quidem feliciter pro noxæ ratione;" or in plain Engliſh, as well as we could, conſidering what ugly, lame, painful, and uſeleſs ſtumps they always make.

Whether it be the pompoſity of his language, that has deceived us, I cannot tell; or whether the world be too willing, as I fear it is, to truſt to bold aſſertions, though ſupported with but ſlender proofs: yet ſo it is, that Belguer has got credit for all that he has ſaid, and for much more than he has done. His aſſertion is, that he had cured a great many who had their limbs entirely ſhot away, this we find in his ſecond paragraph: but preſently after, comes a long hiſtory of the miſeries which theſe poor wretches ſuffered during their confinement of ſix months. Theſe accidents, as he calls them, (though I fear they are rather too frequent to be explained honeſtly by this old name of ACCIDENTS); theſe accidents I ſay, are enumerated in his twenty-firſt paragraph, where we are told of the manner of pulling away the rotten bones at every new dreſſing; of balſams for preventing an exceſſive diſcharge; of pulling the bones when they do not come out of the ſtump; and of ſawing them off, when we find that we cannot pull them out; of bark and ſoups, and diets for ſupporting the ſtrength; of fevers and of febrifuge drugs; and of the ugly changes that come upon the ſtump, when the fever comes on.

But the winding up of his ſubject is the moſt cu-

rious of all, where he tells us*: "Concerning these same lacerated legs and arms, when the member is torn away from the body, I must add, that as far as I know, not one of those who had lost the thigh, were brought into our hospital; I have little doubt but that every soul of them died of bleeding. Some, indeed, of those who had the arm blown away, were saved by the surgeon's tying the arteries and dressing them upon the field of battle."

So that after the fairest examination, Mr. Belguer's success goes just thus far and no farther; that all those who had the thigh carried away, died of bleeding; that some of those who had the arm carried away were saved; that many of those who were thus saved, after losing the arm, or of those who lost smaller parts, as the hand, or fore-arm, or foot, were cured as well as could be expected, "satis feliciter pro noxæ ratione," after five or six months confiement; and as for the fevers, diarrhœas, carious bones, and profuse discharges, the shape of the stumps, and their value to the poor fellows; all this must be left to the imagination of his reader: and though the imagination be not indeed a calculating faculty, it is the only faculty we have left us for representing the proportions of these cures; since Mr. Belguer, although he tells us when he entered upon his duty, how many wounded he had, and how fast they died in former years of the war, and how easily he saved them by the new plan, has yet never condescended to number the stumps which he left upon the Prussian establishment.

§ XXXV.

Thoſe, ſays Mr. Martiniere, who thus declare againſt amputation (in ſhattered ſtumps) do make the very worſt kind of amputation. Mr. Ranby was ſo intent upon preventing theſe dangers, and on having theſe amputations early performed, that he adviſes the ſurgeons of ſeveral corps to collect themſelves into ſmall groups, and plant themſelves behind the line, in forming for an engagement; and indeed, tents are uſually prepared, where all ſuch ſudden operations may be performed upon the field.

---

2. OF FRACTURED BONES.

THESE ſhattered ſtumps are nearly an epitome of all the dangers which aſſail us in the caſe of a wound with fractures of the bones; for there we find, as in this caſe, tedious exfoliations, diarrhœas, fevers, and profuſe flux of ſerum or pus; but great as theſe dangers may be, they have no influence on the ſpirits of thoſe who are bent up to a doctrine; and accordingly Mr. Belguer never cut off one ſingle leg nor arm. He had ſeen the ill ſucceſs of amputation in the former years of the war, and was reſolved he would not allow of an amputation, no not one, however dreadful the caſe. His enthuſiaſm could not perhaps be told but in words which muſt ſeem ſplenetic and raſh; but to avoid any feeling of this kind even in my own mind, I ſhall ſimply tranſlate his paragraph.

" The ſecond caſe in which ſurgeons uſually amputate, but which I have always cured, is that where

a mufket-ball, grape, granade, or any piece of iron, ftone, &c. broken by fhot, wounds the bones of a foot, or hand, or leg, or arm, fo that they hang from the reft of the member loofe and vaccillating." (He re-prefents the foot or hand as abfolutely dangling; "tam miferere contufa ut huc illuc labet pendeatque," p. 43.) This is the mere enthufiafm of the thing; and when we find a furgeon pretending always, or almoft al-ways, to cure fuch wounds in which a foot or hand are left dangling from fide to fide, "huc illuc labentes at-que pendentes," we are bound to examine into the na-ture of fuch wound, and try whether the nature of the thing and this bold teftimony will agree.

When a gentleman, falling from his horfe, has bro-ken his leg, and there are projecting bones, though he is carried foftly to town, laid in his own houfe, has the happinefs of his friends around him, and the ad-vice of the beft furgeons, ftill we are not without our fears. But when a poor fellow is wounded, who, by the duties and hardfhips of a military life, and all the fatigues of a long campaign, is become fickly and weak; when his knee is wounded with a mufket ball, and all the bones are broken; when his leg is fo fractured by a cannon ball, that the bones are reduced to fplin-ters, for the length of many inches, and the mufcles and extravafated blood lie like a mixed and gangre-nous mafs below the fkin; when to thefe injuries are added, perhaps, lacerations of the chief arteries, what can we do? Is this a cafe to be cured in any circumftan-ces? Is it to be cured in an hofpital, where, as Belguer himfelf tells us, there are miferable beds, fcanty food,

and poor clothing; where there is nothing but cold and naftinefs, uncleanlinefs and infection, and putrid fores; where new crowds of wounded pour in upon them after every battle, with tales of misfortune or fuccefs always agitating, fometimes alarming? There is, in fhort, no kind of wretchednefs that is not feen here, and none which Belguer does not freely acknowledge. Is it then to be believed, that a man thus wounded, can be faved, after being thrown into this charnel-houfe, amidft the cries of the dying, the fights of the dead, and all the horrors of infection? What is it that Boerdenave means, when he declares, "That thefe tales of fuccefs are feducing, only to thofe who are not fkilled in practice." Surely, he means by fkill in practice, a knowledge of the manifold dangers which attend on fuch a wound; he muft mean, the knowing what fate awaits thofe whom we fhall attempt to fave; fuch a fcene muft be witneffed too often in the beft regulated hofpital; but where (as in the Pruffian hofpitals) no limbs are cut off, the fcene muft be dreadful indeed. If all limbs be preferved many muft gangrene; if no amputation be performed, all the fhattered ftumps muft gangrene; then the floughing ftumps and gangrenous limbs, the exfoliating bones, long accompanied with a ferous and putrid difcharge, muft infect the whole, fo as to make the hofpital a lazar-houfe of ftinking fores. There, as Belguer acknowledges, diarrhœas, dyfenteries, fevers, and all kinds of difeafes prevail; and there is often a fudden changing of the wounds, and a fudden changing of the health alfo, which he finds it difficult to fight againft,

with his bark and wine; and I fear there were often ſudden changes of another kind, which he is too unwilling to confeſs. If every ſtump took five months in being healed, and every fractured limb endured a nine month's cure, you may conceive more eaſily than I can explain to you, the emaciated ſqualid figures of ſuch an hoſpital, ſtriving to raiſe themſelves in their beds; and the miſerable condition of thoſe, who, after ſuch a nine month's cure, crawled out of ſuch an hoſpital, as if riſing from their tombs. If this be what Boerdenave means by ſkill in practice, we may, with great ſecurity, add Mr. Ravaton's aphoriſm to his warning, and ſay, "Wherever the thigh bone has been entirely broken (by a ball, viz.), I have ſeldom ſeen the patient ſaved." And we may add alſo that of Mr. Boucher's, who, though himſelf an enemy to amputation, allows, "that the limb muſt be cut off; whenever a great bone, as the thigh bone, tibia, or fibula, is broken with deep fiſſures, or with projecting points of bone, which we cannot cut away, or where ſuch bones are broken in ſeveral places; or where the head is broken from the body of any of thoſe bones, nothing but amputation is to be looked to." He allows, alſo, that the ſymptoms, during the cure of ſuch a wound, may require amputation; as twitchings of the member, ſuch as are in danger of being communicated, and ſo cauſing general convulſion; caries of the whole thickneſs of a great bone; flabby ſores, ſerous and profuſe ſuppurations; and, finally, gangrene, in which it was never doubted, that amputation was the ſole reſource. And a great ball cruſh-

ing the bones of the leg, or disordering a great joint, as the knee, though it should merely fall upon it by its own weight, surely cannot be cured but by amputation." Mr. Boucher acknowledges justly, "that whatever the dangers of amputation may be, yet we know, that there are certain cases where it cannot be avoided *." Mr. Kirkland's rule is a sensible and correct one: "That in compound fractures of the long bones of the extremities, we should act on the side of probability; if there be a probability of saving the limb let it be saved; if there be no hopes of a cure without amputation, let it take place without loss of time." The wonderful recoveries which Mr. Kirkland has recorded, after the crushing of limbs, by waggon wheels, are instructive and encouraging; we should venture almost any thing in fractures of that kind; but when made by a cannon ball, and complicated with much ecchymosis and wound, the danger is more pressing.

---

3. OF A WOUNDED ARTERY.

WITH a wounded artery, we know how hard it is to perform a cure in any case; but in a case of wounded artery, with the complication of shattered bones, a bruised wound, a rising fever, and a swelling of the wounded limb, I venture to say it is next to a miracle, if the patient escape gangrene. Such a wound

* Page 311.

is like that recorded by Kirkland, of a poacher who was ſhot in the arm with a horſe-piſtol loaded with very large ſhot, the mouth of the piſtol almoſt touching his arm: The humeral artery was torn to pieces; the laceration of ſuch a wound prevented bleeding, but the whole arm being violently bruiſed, gangrene came on; and when Mr. Kirkland ſaw him on the third morning he was dying of the gangrene.

Thus, in aneuriſms, ſays Mr. Kirkland, "Amputation may, or may not be required, according to the accidents of the caſe." In a ſimple aneuriſm, as from bleeding, there can be no doubt of ſaving the limb; but this complication of aneuriſm in a great trunk, with a lacerated and fractured limb; or, in plain terms, a gun-ſhot wound, with a lacerated artery, is the very caſe which can hardly be ſaved. If we enter at all into debate upon the queſtion of cutting off a fractured limb, without any wound in the artery; ſurely the queſtion ſhould be very eaſily reſolved, where that alſo is added to the other dangers? If the artery merely be wounded by one ball, or one ſlug, though it were the femoral artery, as in the caſe of the gardener recorded by Deſſault, even after ſuch wound in the femoral artery, we may ſave the limb; but when, as too often happens, the bone and the artery are both wounded at once, the patient can hardly be ſaved.

4. OF A WOUNDED JOINT.

As for a wounded joint, take the united experience of all ſurgeons which has eſtabliſhed this, as the true prognoſtic, that "WOUNDS of the JOINTS are MORTAL."

Hippocrates ſays, that wounds of MEMBRANOUS PARTS are mortal. Now what Hippocrates meant by this, is very plain: He judged theſe parts nervous; for the old phyſicians had confounded the idea of membranes and nerves; and wounds of the white or membranous parts were thought to be ſtill more dangerous than the wounds of nerves. Here then we perceive, that this old aphoriſm is a doctrine, not a fact: But when a modern ſurgeon ſays, wounds of the joints are mortal; he does not put forth his hypotheſis, he merely declares a fact which the concurring teſtimony of all ſurgeons confirms. He knows, that a raſh inciſion into a joint will, like an accidental wound, occaſion a very painful and ſudden death; he knows, that a mere cut upon the joint, through its capſule, is a terrible accident, independently of fractured bones, or a great laceration; but that if theſe be joined, the patient can hardly eſcape: And ſuch is his faith in this aphoriſm; he ſees it ſo often confirmed by experience, "that wounds of the joints are mortal," that, inſtead of ſeeking to lay down proofs of this danger, a writer leaves it to the recollection and experience of every ſurgeon; he dwells upon ſome hopeleſs caſe, which he or his friend has had the good fortune to cure; inſtead of accumulating uſeleſs proofs of an acknowledged principle that ſuch

wounds are mortal, he gives rather exceptions, knowing that, according to the lawyer's adage, "exceptio firmat regulam," that the exception but confirms the rule; though, what he means to record as a mere exception, is too often underſtood by the ſtudent as an imperfection in the general rule, and the very report of the exception throws him back into a heſitating and uncertain ſtate of mind! Thinking only of this wonderful recovery, he willingly forſakes an uncomfortable rule, to lay hold on this one glimpſe of hope, while indeed, if he reaſoned fairly, he would perceive that the exception ſhould be loſt in the fulneſs of the general rule, and not the general rule diſturbed by the exception *.

* The young ſurgeon never ſhould allow himſelf to forget how this confuſion comes about. There is no difference of opinion, for no one is giving an opinion; every ſurgeon in the kingdom delivers into ſome valuable repoſitory the accidents of his practice, the wonderful recoveries thus riſe up to the ſurface, while all the miſcarriages ſink down to the bottom, and are never more heard of; ſo that wonderful recoveries are every where ſoliciting the ſtudent's attention, almoſt every caſe he reads is an exception to ſome general rule; while there is no ſyſtematic writer buſy in ſupporting and ſettling the general rules, or in confirming and eſtabliſhing them againſt this hoſt of exceptions: Wounds of the heart, wounds of the pericardium, wounds of the bowels, wounds of the bladder, wounds of the ſtomach, wounds of the brain, wounds of the great arteries, wounds of the joints, are all mortal; and yet the liſt of exceptions, that might eaſily be extracted from the indexes of caſe-books and collections, is endleſs. Let not theſe move the judgment of a young man, when he firſt enters upon the practice of his profeſſion; and, when he is old, he will have no need for caution like this; general rules will then have got the due aſcendency in his mind, theſe little exceptions will have fallen to their right level.

There is one reprefentation ftill wanting to complete the difcuffion of this fubject:—It is the fad condition of foldiers, with whom too often their wounds, as wounds, are but the fmalleft part of their danger.

Thofe who have been much accuftomed to fee men conveyed wounded from the field, with lacerated arteries and broken limbs, declare to us, that their cries and fufferings are moft affecting. The army, indeed, which goes onwards, leaves its wounded fafe behind; but, in retreat or flight, and, after a day of fighting, which is a day of fatigue, what muft be the condition of thoufands left upon the field, or thrown in heaps upon waggons or carts, and hurried along the rougheft roads, from poft to poft, with bleeding arteries and fhattered limbs, and with points of bone piercing the flefh, and exciting at every ftep of this terrible journey, the moft dreadful cries? Some fainting with lofs of blood; others writhing with pain, many delirious, and many fuffering under the convulfions and agonies of immediate death. There the officers, and foldiers, the dead, and the dying, all thrown together in waggons, are put down in the neareft hofpital to take their fate: But if this retreat be continued, they are again taken from their bed of fuffering, and often, even in the firft movements, they faint and expire! If horrid war muft not ceafe, furely it were for the honour of human nature, that fome provifions were made, fome mutual terms entered into betwixt contending nations, for the honourable treatment of the wounded. Army furgeons have long ftrived to invent fome means of conveying their patients more fafely, but all in vain: A

rude ſquare box was preſented in the Academy of Surgery of France, invented by one of their greateſt ſurgeons, La Faye;—others were invented by Mr. Gooche, having circles and buckles,—and ſprings very ingenious, and ſurely, in ſome caſes, very uſeful; and this alſo (of conveying fractured limbs ſafely) is the chief uſe of Mr. Wathen's SPLINTS, which are perhaps the moſt ſimple and manageable, and moſt convenient of all theſe machines. Perhaps the conſtruction of waggons, with hammocks ſlung in them, might be ſtill more uſeful; but move them as tenderly as we may, we ſhall ſtill hear the ſame lamentations that Ranby makes, about "the cruelty of conveying wounded men away under all the miſeries of lacerated limbs and bleeding arteries." To ſuch ſufferings, there cannot fail to ſucceed ſpaſms and fevers, inflammations and gangrenes, with all ſuch diſorders of the general ſyſtem, or of the wounded limbs, as muſt render vain every attempt to ſave either the limb, or the life of the patient.

Thus you will foreſee an argument of neceſſity as well as of choice, and that limbs, which in happier circumſtances might have been preſerved, muſt often, in a flying army, or in a dangerous camp, be cut off. It is leſs dreadful to be dragged along, with a neat amputated ſtump, than with a ſwoln and fractured limb, where the arteries are in continual danger, from the ſplintered bones, and where, by the leaſt rude touch of a ſplinter againſt ſome great artery, the patient in a very moment loſes his life.

When we caſt an eye over this long catalogue of

dangers, and confider the hardfhips and mifchances of a foldier's life, we fee plainly that in the cafe of gun-fhot wounds, in camps and hofpitals, many limbs muft be amputated, which, in private practice, might have been faved. And we cannot but be furprifed when we firft hear army furgeons declaring, that they never amputate, however defperate the cafe. But when we look into the records of their practice, we find them driven into this extreme by abfolute want of fuccefs, whenever they performed amputation. To what caufe we are to trace this want of fuccefs, it is not eafy to determine; perhaps to operations ill performed,—perhaps to operations done at improper feafons,—a thoufand accidents may affect this point, and we have the comfort of knowing, that this want of fuccefs is not univerfal;—Mr. Belguer fays, "My chief motive for refufing to perform amputation was, that I had obferved, that in the former years of the wars, *all* died who had their limbs cut off." Why, furely if all died who had their limbs cut off in the former years of the war, Mr. Belguer could not have done otherwife than as he did, i. e. to leave all thofe, wounded with gun-fhot wounds, to take their chance, to live or die *.

* "Jam cum ex tot vulneratis, quibus per priores belli annos ob graviffima vulnera artus refecti funt, vix unus, alter ne vix quidem, fervatus fit; fine errandi periculo poterimus conjectare, haud dubie maximam horum, quos neglecta membri amputatione fanitati reddidimus, vitam fanitatemque cum morte commutaturos fuiffe, fi vulnus, quod Chirurgus, artum præfcindens, facit, ad vulnus, in acie acceptum, acceffiffet." Dr. Ferriar obferves, "that truth diftils but very flow through Teutonic Latin."

The French ſurgeons, during the war of the 1746, declare with one voice, that "of thoſe who had their limbs amputated, two thirds ſurely died."

To this we have only to ſay, that if, in the Pruſſian camp, every man who had his limb amputated died, that is to be the rule of the Pruſſian ſurgeons. If in the French military hoſpitals, not leſs than two thirds died, then let that be the rule and vindication of the French ſurgeons; but the rule of the Pruſſian ſurgeons was not to be the rule of the French ſurgeons, and the rule of the French ſurgeons is not a rule by which the Britiſh ſurgeons are bound to abide. And the amputations of the year 1745, are, I believe, very unlike thoſe of 1795.

In that war, they did not even attempt to perform the amputation by double inciſion, but cut directly to the bone; they never, even in the moſt favourable circumſtances, could peform their cure under four, five, or ſix months. We find their patients dying of hæmorrhages, on the fifth or ſixth days. We find them performing their amputation in the time of fever and irritation, or in the midſt of camp diſeaſes. Surely, then, it had been eaſy to foretel what would be the iſſue of practices like theſe*.

But proofs of theſe miſdoings are required; and I will not leave you under that ſlight impreſſion that

* Mr. Lucas ſays, of not leſs than ſixty or ſeventy amputations done in our hoſpital, not more than four or five have died; and this is indeed the ſuperiority which the neat amputations, and the ſpeedy adheſion procured by Mr. Lucas, Mr. Allanſon, and their friends, in that part of the country, muſt give them.

my bare aſſertions may make: The operarions upon which the French ſurgeons have reaſoned, were thoſe which were performed after the battle of Fontenoy; and my remarks are, 1ſt, That theſe amputations were not performed abſolutely upon the ſpot, as in a beſieged city, in trenches, or in a ſhip of war. The ſoldiers were hurried away to the hoſpitals of Doway and Liſle, and there theſe unfortunate operations were performed. 2dly, That they were performed after the pain, fever, or convulſions had come on; for Mr. Faure ſays, "the earlier you amputate, the ſooner you condemn your patient to die; for death muſt be the conſequence of performing operations in a ſyſtem diſordered and troubled, and in a febrile ſtate, from the accidents of the wound." This he ſays in alluſion to the amputations performed after this particular battle. Nay, this of amputating in circumſtances like theſe, was not done merely through neceſſity; it was common doctrine and practice with the French ſurgeons. Boerdenave ſays, "If convulſions, ſpaſms, and other ſymptoms come on, and if inciſions, dilatations, and the extraction of foreign bodies do not appeaſe them, unqueſtionably we muſt amputate*." "Or if in conſequence of the acute continual pains, there come on convulſions of the part, which even the cutting of the tendons acroſs does not appeaſe, then we muſt perform amputation †." If the French ſurgeons were buſied in the midſt of fevers and other

* P. 234. N. B. Mr. Faure repeats this at page 237.

† Mr Boucher, p. 312.

bad ſymptoms, and what is worſe, dilatations and extractions of foreign bodies, in performing operations which ſhould be thought of only when all theſe diſorders are quieted, we ſee in that piece of miſconduct, one cauſe of their ill ſucceſs.

3dly, That they performed their amputations but poorly, is plain from what Mr. Boucher entitles, " A liſt of our ſucceſſes by amputation, in our hoſpital of St. Saveur;" in his liſt of nine patients, one had his arm amputated on the fourth day; ſurely this was not the moſt favourable moment; another had amputation performed ſix days after the battle; another on the fourth day, the ball remaining in the knee-joint, and he died; one died the fourth day after amputation, which looks as if there had been ſomething wrong in the operation itſelf; a captain of the regiment of Dillon died of the bleedings the eleventh day after the amputation; and yet of theſe nine ſubjects they ſaved four. Even by their liſt of ſucceſſes, it appears that ſome had died of hæmorrhagy, and of courſe, that the operations were ill performed; and in this ſame liſt, Mr. Boucher records the dates of two cures only, the one is of an amputated arm, cured in five months, the other of an amputated leg, cured in ſix months. We are told, moreover, that at this battle of Fontenoy, there were few ſurgeons; ſo that many loſt their lives by the amputations not being performed till they came to the hoſpitals, when it was too late: it is very likely alſo, that where the ſurgeons were ſo few in number, they could not be very good.

Then, ſurely, in this affair of the expediency of am-

putation, we muſt, in order to do juſtice to the queſtion, contraſt the operations of 1745 with thoſe of 1795. Thoſe were ill performed ;—ſome died on the fourth day ; ſome died of hæmorrhagy ; ſome died languiſhing under the gleety diſcharges of conical and ill-conditioned ſtumps ; and none of them were cured under five or ſix months of ſuffering and danger : Whereas, our ſtumps, inſtead of being open for five or ſix months, are more frequently healed by adheſion in five or ſix days ; and this quick adheſion, though it be not perfect, will almoſt always be ſuch as to prevent the bleedings or gleeting ſores, the diarrhœas and fevers which, in a military hoſpital, are ſo much to be feared ; and alſo, to leſſen the danger of any ſudden movements which the ſickly part of an army may be forced to make. The adheſion is almoſt completed with us before that term in which they lifted their firſt dreſſing, in fear and trembling, and with a tourniquet round the limb, leſt the arteries ſhould burſt out*.

In ſhort, every ſtep of our inquiry proves moſt clearly to us, that ſurgeons have been driven into this line of conduct by the ill ſucceſs of their amputations, till at laſt it degenerated from a queſtion, Whether, in certain circumſtances, we ſhould amputate a limb ? into a queſtion, Whether amputation could be ſo performed, as to ſave many lives ? Belguer was driven into this line of conduct by the ill ſucceſs of amputation in

* No doubt, a great abatement of any ſucceſs we may promiſe ourſelves, muſt be made for the bad air of ſuch an hoſpital, which will not allow adheſion to take place, neither ſo regularly, nor ſo eaſily, as in a healthy hoſpital, or in private practice.

the former years of the war, and we ftill find the French furgeons harping upon the old ftring. But it is very plain, that the fucceffes of the Pruffian furgeons are not to be received as rules for the French furgeons, nor the ill fuccefs of the French to ftand as precedents for the Britifh furgeons;—nor are the operations of the year 1745 to be put in competition with thofe of the year 1795: The army hofpitals give no rule for a county infirmary, nor a great hofpital for a fmall one;—nor is private practice to be guided by hofpital practice. We muft, in the general queftion, make our calculations upon a greater fcale, rifking fometimes more, fometimes lefs, the degree being left to the difcretion of the furgeon;—and if the foregoing reafoning can be of any fervice to the young furgeon, it can be only by hinting at a few of the very complicated principles which are to regulate his conduct.

"Thus we perceive how ftrangely a man's opinions grow up in his mind, diftorted by a thoufand circumftances." Belguer forbade amputation, while Schmucker, who fucceeded him in the care of the Pruffian hofpitals and camps, cuts off the leg where the tarfus only is fhot, and in almoft all the dangerous wounds of the lower extremities. Pott advifes amputation, becaufe he had practifed chiefly in a crowded ill-aired hofpital, where it was dangerous to attempt the faving of limbs, while it was but too eafy a matter to cut them off. Kirkland, on the other hand, is againft amputation, becaufe he practifed chiefly among hale and ftrong country fellows,

who, after their accidents, continued to live in the country, with a wholefome diet and pure air. In reminding you of thefe various and fluctuating opinions, I do not impeach the conduct of thefe excellent furgeons; I only warn you that thefe authorities are but the opinions of men, of mere men;—that the example or precepts of the greateft furgeons, though they may direct and affift your judgment, can never give you an exprefs rule;—that it is upon your own judgment chiefly that you are to rely:—That it is, indeed, your duty to ftudy the general argument with all poffible care; but that the variety of circumftances is fuch as to make each individual accident a peculiar cafe,—a variety for which there is no exprefs nor abfolute rule.

When I fay to you, that you are to truft chiefly to your own judgment, I would have you keep in mind thefe chief points, that you cannot fave all thofe whofe wounds and fractures you pronounce to be fimple, and attended with little danger;—nor will all thofe patients inevitably die, whofe limbs are fo bruifed, that you advife them to be cut off:—And you muft confider, above all, how much your patient's life depends on the decifion of the moment, and how melancholy the confequence is, of your allowing that happy moment to elapfe, which is never to be redeemed.

I was called, one evening, to a man of forty years of age, in moderate health, who had a fimple fracture of the tibia only. The fmaller bone was unhurt,—there was no diftortion nor any great inequality,—the end

the broken bone was not particularly felt,—the n was untouched;—and being called on the very inſtant of the accident, I had him ſafely and eaſily conveyed to bed.

He then proceeded to tell me the cauſe of his accident; but with ſuch rapidity of utterance, that I doubted not that he was much intoxicated. He was ſo reſtleſs and unmanageable, that I was obliged to make one of the young gentlemen ſit down in bed, above his ſound leg, and hold the broken one ſteady with both his hands. I was obliged, upon the whole, to be rough both in my manner and in my operations, till I had got good ſtiff ſplints, and a ſteady bandage firmly applied. But when all this was done, and I had laid my patient down in bed (for till now he had ſat upright, talking inceſſantly and vehemently), although I had given him a very large opiate, and a glaſs of warm wine, he trembled and ſhook ſo violently, as to make the bed ſhake under him, with ſhocks and ſudden convulſive twitches, which were truly alarming;—his ſhaking was at firſt like the cold fit of an ague, or like that convulſive trembling which often ſeizes women in childbed, which is at once ſo alarming and ſo harmleſs: but his ſhaking continued and increaſed all the evening, with a confuſion of mind, and wildneſs of countenance, which was really frightful; and with ſudden ſtartings which ſhook even the room, and would have diſordered the leg very much, if I had not ſecured it, by tying it down betwixt two great pillows.

Being now at leiſure to make deliberate inquiries, I

was aſſured, that he was not drunk,—had never been addicted to drinking,—had never been troubled with any nervous diſeaſe.—I called twice during the evening, and found him every moment more and more ſtrongly diſordered. Every new report, concerning his former habits, and the certainty of his being a ſober and healthy man, convinced me, that this was no ordinary caſe. I deſired, that Dr. Monro might be called in.—Very large doſes of muſk, opium, and camphire, were given for three days.—During all that time, night and day, he continued inceſſantly ſhaking, ſo as to move the bed under him;—he never ſlept,—he was always wild, ſometimes highly delirious, ſome-ſtruggling violently to get out of bed, and ſometimes ſlightly convulſed. He laboured in this miſerable condition for three days, fell ſomewhat lower in the fourth day, and then died.

Upon diſſecting his limb, I found the ſkin and muſcles entire,—the tibia only broken, and that fairly acroſs;—there was no remarkable ſplinter of bone, and, as far as I could diſcover, no lacerated nor wounded nerve,—there was but little thickening, as yet, of the ſurrounding membranes,—little effuſion, and that not yet gelatinous, but ſerous merely,—no inflammation; —and, notwithſtanding all the violence of his diſorder, there was not even the ſlighteſt ſwelling of the ſkin; —every thing entitled me to ſet this down, as one ſingular inſtance of the uncertainty of general concluſions, and how little we are entitled to ſay, that any caſe, even the moſt ſimple, is abſolutely ſafe.

On the other hand, we know, from frequent experience, what ſtrange recoveries Nature and time

will bring to paſs, where the moſt judicious ſurgeons have declared the caſe abſolutely deſperate, and adviſed amputation. I may fairly give Mr. Lucas as an example, of a judicious ſurgeon condemning a limb; and how well he reaſoned, in ſo doing, in the following caſe, the ſequel will explain; and as for this caſe itſelf, it is one of the moſt ſingular in all reſpects,—it proves, in the moſt unequivocal manner, that although the conſtitution ſhould be ſo ſtrong, and ſo well managed, as even to bring the patient ſafely through all the dangers of a nine month's cure; yet the limb ſo preſerved, will be rather a burden than a help to the patient, who will ſometimes, even after the cure has been accompliſhed, be obliged to have it cut off.

"Eſther Parſons, aged 73 years, was admitted into the infirmary, as Mr. Lucas's patient, with a compound fracture of each leg, from a coal-waggon paſſing over them. One of her limbs was taken off above the knee immediately, according to Mr. Allanſon's method. In the other leg, four inches of the tibia were removed, and due pains taken to make the woman as comfortable as her deplorable ſituation would allow.

"After a confinement in bed for upwards of ten months, various attempts were made to ſupport her upon crutches; but after trying, for a few weeks, ſhe endured ſo much pain, that ſhe begged for the removal of a limb, that was to a degree burdenſome, without a proſpect of any amendment *."

* Page 234.

This old woman had lain in bed, and been ſupported, no doubt, with ſome difficulty, through all the pains and dangers of a nine month's cure.—She was now well;—ſhe had been trying, for ſome weeks, to walk with crutches;—ſhe was a woman too, whoſe work being all of a ſedentary kind, ſhe would have felt leſs the awkwardneſs or inconvenience of a deformed leg; but yet ſuch was her ſenſe of her own ſituation, that ſhe begged to have this remaining leg cut off;—ſhe had ſuffered amputation already, and knew but too well the pain ſhe was to undergo, and this was no ordinary caſe, in which the patient was to loſe a diſeaſed limb;—ſhe was to loſe now both her limbs, and to crawl upon the ground. This is the very pureſt caſe of all; it was determined not by the rules of ſurgery, nor by the prejudices of the ſurgeon; it was determined by the patient's feelings and conſciouſneſs of her own condition. It proves, that her ſurgeons judged wiſely, in cutting off that leg which they did cut off; and that they had better, alſo, have cut off that which they had tried to ſave. It proves, that when there is a queſtion about amputating, in a very bad compound fracture, the queſtion is, Whether the patient will conſent to loſe the leg at once, or riſk the dangers of immediate gangrene and death? and after eſcaping theſe firſt dangers, ſtill encounter the pains and diſtreſſes of a tedious cure. And it almoſt proves, that wherever judicious ſurgeons put the queſtion among themſelves, of cutting off or of ſaving a leg, that leg is ſo ſhattered, that it is hardly worth the ſaving; of which we have alſo another ſtriking

ample in the next page, where Mr. Lucas ſays, James Walker, upwards of ſixty years of age, was admitted into the infirmary with a very bad compound fracture, which prevented him from having his bed made for nearly nine months. At firſt every attempt was made to unite the wound by the firſt intention; but a ſuppuration ſoon prevented ſuch an effect. He was repeatedly in imminent danger, and often expreſſed a wiſh to have his leg taken off. He did in *time recover*; but, for ſome years, his limb has continued of *little uſe to him*." * We know too well, how much miſery is cauſed by a leg which is of little uſe; and we may underſtand by this, that thoſe ſurgeons, who boaſt of cures of this kind (a folly which Mr. Lucas is far from being guilty of), have more pride in relating the caſe, and telling what difficulties they have encountered, than they could have in ſhowing the limb which they boaſt of having ſaved, or explaining how well the poor man was able to earn his bread with it.

It recals many ſcenes of diſtreſs, which every ſurgeon muſt remember to have ſeen, of fine healthy

* Theſe two caſes ſettle entirely that queſtion, which Mr. Belguer propoſes ſo confidently in the following terms: "Quotus enim quiſque eſt, qui non penitiſſime commoveatur animo, ſi de membrorum amputatione mentio injecta fuerit, ſi homines, mutilis manibus, truncatis brachiis obambulantes, aut altero pede abſciſſo claudos, ac pedem ligneum trahentes, grallisve innitentes magis quam ingredientes, viderit, quique non tolerabilius malum putet, membrum aliquod debilitatum varieque diſtortum atque defiguratum, neque ad priſtinos uſus PRORSUS aptum habere, quam eo prorſus carere."

young men belonging to wharfs, warehoufes, mines or coal-pits, having their limbs fo fhattered, that the furgeon has pronounced them dangerous in the extreme degree; and that if the patient lived in trying to fave fuch a limb, he muft make a hair-breadth efcape;—and, among thofe fo hurt, the furgeon will remember fome dying of immediate gangrene,—fome loft during the fecondary fever,—fome wafted by the profufe difcharges and gleety fores;—and a few fubmitting, not without danger, to have their limbs cut off, even in the midft of this fuffering. The furgeon will recollect, with pleafure, a very few who have laboured through their nine month's cure, and yet, even among thofe few, he will alfo remember fome who have undergone all this long fuffering and confinement, to fave a limb, which was more a burden than a help to them, fuch as the furgeon was afhamed of, and fuch as the patient would fain have had cut off, but that he had not, like the old woman juft mentioned, the courage to defire an operation. It puts us in mind of that fentence of Mr. Kirkland, which is one of the many inftances of his fterling good fenfe in matters of practice:—"That the injury, which requires amputation, is of that violent nature that it cannot be miftaken, the deftruction of the parts, and the impoffibility of their being faved, is manifeft at firft fight *."—This expreffion muft, no doubt, be qualified a little, for the very beft furgeons have been deceived, and no man of good fenfe or honour will

* Page 12.

refuſe his opinion, for fear of being miſtaken, for fear of ſhame; we know too well the uncertainty of all reaſoning on what nature will do or ſuffer, and how weak our own judgment is. We muſt expect to ſee many live, whoſe limbs have been condemned, and ſome die whom we thought we could ſave. We muſt riſk ſome limbs which might have been preſerved, to ſave a few lives. When the queſtion comes to this, it is not whether the ſurgeon is right or wrong, but whether the poor man ſhall live or die. And then, if a judicious ſurgeon, upon deliberate conſideration of the whole caſe, ſhall think either that life is in danger, or that the limb cannot be preſerved, or that the one ſtands in competition with the other, he may deliver his opinion honeſtly; no ſhame can follow, whatever the event may be.

In this great queſtion, there is not one moment to loſe. You hold your conſultation in the evening; it is then that you decide the patient's fate; and by the morning matters are ſo changed, that whatever your opinion was, by that opinion you muſt abide.

" A patient was brought into St. Bartholomew's hoſpital, having a compound fracture of both the bones of the leg, within four inches of the ancle joint, and the muſcles alſo were much torn. Mr. Crane, who was ſoon after ſent for, took no ſmall pains to perſuade the man to loſe his limb, as the only chance of preſerving his life; but being unable to prevail with him, Mr. Crane removed nearly two inches of the tibia, placed the limb in an extended ſtate, and gave ſuch directions as he thought neceſſary.

"The next morning, the patient having ſuffered more than he could poſſibly have done from an operation, was now deſirous of ſubmitting himſelf; but Mr. Crane was of opinion that ſuch a ſtep could only tend to haſten his death, which happened upon the third day after the accident."

Thus, in all ſuch caſes does the patient's fate hang upon the deciſion of a moment; and whenever the limb is ſo ſhattered, by a cannon ball, by the burſting of a bomb, by a waggon wheel paſſing over it, by the falling of any great weight; whenever a limb is ſo cruſhed that there are many chances againſt its being preſerved, and that the attempt muſt immediately endanger the patient's life, and that the limb itſelf when ſaved, will moſt likely be ſhort and diſtorted, ſo as to be rather an encumbrance than a help to him, in ſuch caſe it ought to be cut off. But where a lacerated and bleeding artery is added to theſe dangers, the queſtion is more eaſily determined; this either weakens the patient by the open bleeding, or diſorders the limb ſtill more by the inward driving of the blood; it is not perhaps impoſſible to ſave the patient, but yet the chances are ſo many againſt him, that it would be much better the limb were cut off at once.

"A *coal miner* was admitted into the Leeds infirmary with his leg terribly ſhattered, by a fall of coals, ſeveral pieces of which had penetrated into the broken fleſh, and was mixed with the muſcles. At firſt the bleeding was violent, but it gradually abated; cooling remedies were applied, and a tourniquet was kept in readineſs. The hœmorrhagy always

ceafed before any artery from which it came could be difcovered. Although every attention was paid by a perfon placed to watch the limb, the patient died in ten days. Neither the habit nor ftate of the limb were fuch as to render amputation advifable, unlefs it had been done early."

Once more I muft obferve, that if thefe reafonings are ufeful to the young furgeon, it muft be only by my having hinted at a few of thofe very complicated principles which are to direct his judgment,—no fenfible man has ever ventured to determine, nor will dare to determine this as a general point;—there is no poffibility of defining, beforehand, any future cafe; there is no poffibility of conceiving and marking the various degrees of injury, and the various combinations of contingent circumftances; for, the conftitution of the patient, his accuftomed way of life, his former difeafes, or his prefent health, his ftate of mind, his alarm or his coolnefs, the abfence or the prefence of fever, the conveniences or hardfhips of his fituation; even the manner of his fall, along with the degree and form of the injury; in fhort, a thoufand undefcribeable circumftances muft affect the furgeon's judgment; fo that there can be no fpecific cafe defcribed, no abfolute rule delivered; each accident is an individual cafe; and the conduct of it, together with the fafety of the patient, is to reft entirely on the difcretion and abilties of the furgeon.

But as general rules, which ftill are not beyond the reach of frequent exceptions, perhaps the following aphorifms may be received.

1ft, The chief cafes requiring amputation are thofe in which the limb is crufhed by a great ball, where the mufcles are reduced to a mere pulp, the bones broken, the limb already nearly in a ftate of gangrene,—or where a bomb or great bullet has broken the bones and hurt the joint, although it fhould not have torn the fkin, either from its being an oblique ball, or from its being almoft fpent.

2dly, A limb having the great bones broken by a mufket ball piercing the limb may be faved; a limb in which the fecondary branches of the arteries, or even the great trunk is wounded (if the bones be unhurt), may, as in the cafe of any more fimple aneurifm, be faved. It is only the complication of aneurifm, broken bones, and wounded joint that makes the cafe abfolutely dangerous: and fince no complication of circumftances can admit of a general rule, this muft be left to the difcretion of the furgeon, who muft prepare himfelf by a review of all kinds and degrees of danger, to reafon upon the circumftances of each cafe.

3dly, It is but too plain, that there is a cafe of neceffity, and a cafe of election, that often in a flying army, or in a dangerous camp, we muft be under the diftreffing alternative of cutting off limbs, which, in happier circumftances, might have been faved, or of feeing our patient die a miferable and violent death. It is eafier to be carried in waggons with a well amputated ftump, than with fwelled and broken limbs coated with their own blood, and new arteries torn by the fractured bones at every ftep; and, therefore, if your

patient having a terribly fractured limb, cannot lie in quiet; if you have reafon to fear, that before he can arrive at any hofpital, the limb will have fallen into gangrene, or the man himfelf be delirious or convulfed; if he have wounded arteries, which the furgeons cannot fecure, and that he cannot have fkilful nurfes, or young furgeons to watch the bleedings, you muft cut off the limb.* But here alfo much is left to the difcretion of the furgeon. Nothing feems more harfh or unfeeling, than to fay that any circumftances can be an apology for a thing which fhould not be done; but ftill it is plain, that the circumftances of an army, or a befieged city, make a part of the cafe of every individual foldier in that city or army, and that the neceffity of the thing, according to the vulgar adage, is itfelf a law.

4thly, If the thigh bone be broken into many pieces, and with large fplinters driven through the fkin, if the knee joint be fhattered and torn, if the tibia and fibula be terribly fractured, as by a ball, or a loaded carriage paffing over it, and that along with that compound facture, with crufhed bones, detached fplinters, and the fkin and mufcles macerated in a proportioned degree, there alfo be lacerations of the tibial and fibular arteries, the limb cannot be faved. And although the foot may be faved when a ball has paffed through the heel bone, or has paffed quite through the tarfus (although it have fplintered all the bones), yet when the ball fticks in the tarfus, it is a very dangerous wound (often followed by locked jaw or gangrene), in which it is difficult to

ſave the foot; but when both the ancle joint is laid open, and the tarſus alſo is much lacerated and diſordered, it is almoſt impoſſible to ſave the foot, it had better be cut off *.

5thly, In this fourth rule I have mentioned chiefly the dangerous wounds of the lower extremity; and the reaſon of my doing this falls now to be explained; for it is really in wounds of the lower extremity chiefly, that we are reduced to the hard neceſſity of cutting off the limb. The lower extremity is larger, forming a great proportion of the whole body, whence a high fever and greater pain enſue; and in its wounds there are larger arteries to bleed, greater bones to be reunited or reſtored, and larger maſſes of muſcle and ſkin, to fall into inflammation; but the chief danger is the confinement in wounds of the lower extremities, with conſequent loſs of health. The uniform poſture exhauſts the ſpirits, and the profuſe diſcharges exhauſt the ſtrength; and few have the reſolution to go through all the hardſhips of a nine month's cure. Whereas, in wounds of the upper ex-

* That none of theſe wounds can be cured, it is far from my intention to affirm; I know well that they have been cured; I have ſeen ſuch deſperate caſes cured. We have, among other caſes, one of a knee joint, another of a thigh bone terribly ſhattered, and yet cured by the celebrated Deſſault; but the queſtion is, Whether the dangers be not greater than the chances? and I think the proper thing to be ſaid on this occaſion is juſt this: "When a judicious man ſays that a limb ought to be removed, he does not mean that it is impoſſible, at all events, that ſuch limb can be ſaved, nor that the patient muſt infallibly die." Pott, p. 400.

tremities, the proportion of the wound to the whole fyftem is fmall, the fever flight; the cafe is in all refpects more manageable; a man wounded in the arm can be carried with little comparative fuffering from a field of battle, and he is not confined for months to a loathfome hofpital; the moment that his fever is gone, he is able to rife, he recovers his health, and he preferves it during the whole cure.

We ftruggle long and patiently to preferve the hand, for it is by his hands that the poor man earns his bread; but, in a great wound of the leg, we ought not, by a long confinement, to rifk his life to fociety, or to thofe who are depending upon him; and, when he is forced to lofe his leg, he, ftill having his hands to work with, continues a ufeful citizen, though, no doubt, he will be ufelefs as a foldier; and this very diftinction conftitutes, I believe, the chief difference betwixt the practice of the Englifh and of the Pruffian furgeon, whofe decifion on this point has been, if I am not greatly miftaken, fettled by fome higher authority than that of a jury of army-furgeons.

6thly, Amputation fhould, in thofe cafes where the limb is plainly and irrecoverably difordered, be performed upon the fpot.

When the operation has been delayed, either by the inconveniencies of your fituation, the tardinefs of confultants, or by the real accidents and difficulties of the cafe; in fhort, wherever the pain or fwelling, fever, or convulfion, have come on, there you muft refrain from prefent operation, and muft try to fave the limb. But again, after the patient, having efcaped

the firſt dangers of gangrene, has lain for ſix weeks, or two months, under profuſe ſuppurations or exfoliating bones; if, while you are trying to ſupport him with bark and wine, with very poor hopes of accompliſhing a cure, he ſhould plainly be ſinking under the hectic fever, then again amputation may be propoſed; but it is, on one hand, very diſtreſſing to throw away all hope, and loſe the advantages which our patient has ſtruggled for, through ſo much ſuffering and danger;—while, on the other hand, his life, which was at firſt in danger from pain and gangrene, is now a ſecond time in danger from colliquative ſuppurations and a hectic, which waſtes his ſtrength;—but this very weakneſs, which has brought him into this condition, is ſo far favourable to the ſucceſs of the operation, that it may be fairly queſtioned, whether this ſecond period be not fitter for amputation than the firſt.

7thly, With regard to the operation itſelf, I may venture to affirm, that the ill ſucceſs of the French and Pruſſian ſurgeons proceeded from operations either done under inauſpicious circumſtances, or in themſelves ill performed; and that, by a prudent choice in point of time, and neatneſs in the manner of performing the operation,—a particular care in ſecuring the arteries, and every endeavour to keep your patient clean and warm in an eaſy condition, and in general health, you will be ſucceſsful, not indeed in the proportions of private practice, but in proportion to your means and opportunities; and more than this, no man of good ſenſe can look for.

8thly, To conclude; you muſt never amputate during fever, pain, convulſion, great ſwelling of the limbs, but moſt eſpecially, during that high-coloured inflammation which betokens approaching gangrene; there the diſeaſe is in the conſtitution; by cutting off the limb, you do not cut off the diſeaſe:—The gangrene, in two days, ſhows itſelf upon the ſtump, or the convulſions, which ceaſe, perhaps, for a moment, return along with thoſe ſtartings which follow amputation; and then follow a bending back of the body, locked jaw, and a very cruel death. This is the reaſon of our performing amputation, either on the inſtant, viz. before theſe terrible ſymptoms have begun, or later, and after they have ceaſed; this is the foundation of Le Dran's axiom, "That where there is plainly a neceſſity for loſing a limb, the ſooner it is done the better."—And my intention in this reaſoning, and theſe remarks, is to eſtabliſh this rule in your minds above all the ſeduction of wonderful caſes, which, though ſurely true, are yet mere exceptions, which it were better for you not to know, than truſt to too much *.

Here I feel it natural to expreſs my diſlike, once more, of this unphiloſophical way of ſetting up particular exceptions, which our collections abound with,

* I have mentioned my intention of giving a proper review of Belguer's opinions, of which ſome of theſe ſtrictures may perhaps be thought in ſome degree a refutation; but yet I am ſenſible that ſuch an undertaking would be tedious to ſome, and to many, I hope, quite ſuperfluous.

againſt general rules, of which our ſyſtems are very deſtitute.

The true appearance of theſe caſes is really amuſing to a deliberate obſerver; and the concluſion, which ſhould be drawn from them, is very obvious. We could, I think, upon an emergency, produce ten or twelve tales of knives cut out from the ſtomach ſafely,—as many caſes of gangrenous herniæ cured,—a hundred wounds of the brain, with great ſpoonfuls of it, diſcharged, the perſon continuing very ſenſible and witty, and ſometimes, as it has been remarked, wittier than before; and moſt eaſily could we produce a hundred good cures by the Cæſarean operation, the woman being no more hurt than if ſhe had been bled in the arm for a headach. And yet, notwithſtanding all this, no man will believe, that knives are eaſy in the ſtomach, ſtrangulated herniæ ſafe, or wounds of the brain without danger; neither ſhould Mr. Belguer's twelve caſes, nor any twelve caſes produced by any other man, induce a ſurgeon to believe, that gun-ſhot wounds, with lacerated arteries and broken bones, are ſafe, eſpecially if that ſurgeon have ſeen (as indeed we ſee daily) a patient dying of gangrene, from a luxated ancle, in the very moment in which his ſurgeons were conſulting about cutting off his leg.

Such ſtrong repeated proteſtations, upon this ſingle point, cannot be ſuperfluous, when we ſee a whole army of ſurgeons, deputing, as it were, their head ſurgeon to ſay, In all the Pruſſian camps and hoſpitals during a whole war, among ſix thouſand wounded men we have not cut off one ſingle limb!—indeed,

the impreſſion which ſuch an aſſertion muſt make, and the high credit of Belguer's book in this country, leads me, unpleaſant as it may be, to the taſk of explaining his book to you, which ſhall be the ſubject of my next diſcourſe.

THE END.

Printed by Mundell & Son,
Royal Bank Cloſe, Edinburgh.